AMERICA'S DARWIN

DARWINIAN THEORY AND U.S. LITERARY CULTURE

EDITED BY TINA GIANQUITTO AND LYDIA FISHER

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TINA GIANQUITTO AND LYDIA FISHER

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TINA GIANQUITTO AND LYDIA FISHER

Introduction

Textual Responses to Darwinian Theory in the U.S. Scene

"SPECIFIC VALUES" AND "SPECIFIC CONDITIONS"

On June 5, 1861, shortly after the start of the Civil War, Charles Darwin wrote a letter to his American friend the Harvard botanist Asa Gray. In its outline, the letter is in many ways typical of Darwin's correspondence: it opens with some mention of work and overwork, continues to discuss reviews and responses to *On the Origin of Species*, moves on to a request for observations and information, and ends with a brief personal note. But this "typical" letter is remarkable in its details, which include Darwin's response to Gray's recent reviews of works critical of *Origin*, as well as Darwin's reiteration, to his religiously minded friend, of his rejection of design in nature. The conversation easily flows on to other matters, and Darwin asks Gray questions about a new pet project on the sexual organs of *Primula* before concluding with his observations about the progress of the U.S. Civil War and the hoped-for abolition of "the greatest curse on earth."[1]

Darwin and Gray began their correspondence in 1855, a few years before the publication of *Origin*. The English naturalist had gently cultivated a friendship with the American botanist, quickly seeing in his new friend a potential ally and able defender of evolutionary theory in the United States. Indeed, Darwin had shared the secret of his "doctrine" of natural selection with Gray as early as 1857, sending him an abstract of his "long argument" for Gray's comment.[2] Even though Darwin and Gray fundamentally disagreed on the role of design in evolutionary theory, they agreed on other fundamental aspects of evolution, such as the power of natural selection and the descent of all organic beings from a common ancestor.[3] Both likewise rejected special creation and the racist polygenetic arguments of detractors of evolution, who argued against the very idea of common descent. Darwin's faith in Gray was not misplaced: he was the naturalist's bulldog in America,

anonymously publishing the most influential early review of *Origin* in a three-part *Atlantic Monthly* series and fighting off challenges to Darwin's theory by another great naturalist of the era, Gray's Harvard colleague Louis Agassiz. It is hard to underestimate Gray's role in paving the way for evolutionary theory in America; as historian Janet Browne observes, Gray functioned as "the main gateway by which Darwin's ideas entered the United States."[4]

But when Darwin wrote to Gray in June 1861, he was not really thinking about firing what he had come to call his "usual long-range shot" at Gray's theistic evolution.[5] Instead, he was wondering and worrying about two distinct yet suggestively related topics: dimorphism in the flower *Primula* and the "crusade" against American slavery. Darwin explains to Gray that he has "been idling & working at Primula," expecting that his "experiments will explain their dimorphism"—or give *meaning* to, as he writes elsewhere—the existence of two distinct forms of the flower on plants of the same species. He was in the midst of a breakthrough, and his revolutionary work on these hermaphroditic flowers clarified a vexing taxonomic issue, conclusively proving that *Primula* had evolved to possess two different forms of flowers on the same plant, a long-styled form and a short-styled form. By analyzing the pollen grains produced by each, Darwin rightly concluded that pollen from a long-styled stamen could only be completely fertile when united with a long-styled stigma, and vice versa. Any other combination resulted in weak plants with lower fertility or even sterility. Thus, Darwin argued, dimorphism, understood as differentiation from a simpler to a more complex form, developed as an evolutionary adaptation to prevent weak self-fertilization and promote robust cross-fertilization. Among the conclusions that Darwin drew from this study was that differentiation of this sort marked evolutionary development away from a common ancestor.[6]

Darwin's botanical work, which has yet to receive substantial critical attention, is an essential component of his grand argument for the power of natural selection as a primary driver of evolution. Indeed, in between writing his "big books," *On the Origin of Species* (1859), *The Variation of Animals and Plants under Domestication* (1868), *The Descent of Man* (1871), and *The Expression of the Emotions in Man and Animals* (1872), Darwin spent a majority of his time producing painstakingly detailed research into the morphological adaptations of plants. Beyond providing fodder for his arsenal of evolutionary facts, Darwin's plant studies—and the conclusions he drew from them—substantiated a main concept of Darwinian evolution, one deeply problematic for many in the United States: the common descent of all organic life from a single progenitor. In the case of *Primula*, for instance, as Richard Bellon explains, dimorphism "suggested that sterility was not, as proponents of species fixity insisted, a special endowment of the Creator to keep created species distinct."[7] Instead, sterility evolved over time as individuals became distinct from one another. Fertility was a mark of kinship. The kinds of structural

changes witnessed in *Primula* were thus, implicitly if not explicitly, yet another evolutionary argument against the theory of special creation advocated by many of Darwin's staunchest opponents, especially in the United States. To look back at Darwin's relationship with Gray, his "choice" of the well-respected Harvard botanist as a defender of his theory in the United States was, in a way, partly strategic. Since the plant studies were so central to Darwin's thinking about the processes of evolution, Gray was well placed to argue for their relevance as proof of evolutionary theory and to explain that relevance to a large audience, even though he was himself uncomfortable with some of the implications of evolutionary theory.

Following on Adrian Desmond and James Moore's argument that Charles Darwin's hatred of slavery and its scientifically suspect reliance on polygenetic theory in part motivated his study into the common origin of all species, humans included, Darwin's investigation into nature's reliance on the "intercrossing of distinct individuals" and the robust fertility guaranteed by cross-fertilization takes on new salience.[8] Indeed, the question that Darwin poses about *Primula* in his letter to Gray—"Are there other cases of two forms *living mingled in nearly equal numbers?*"—a letter written just at the start of the Civil War, suggests that Darwin was very much thinking about human races as he looked into the "sexual elements" of plants.[9] He ends his letter to Gray with a comment about America's increasingly explosive political conditions, and he wonders whether his friend is "all too overwhelmed with public affairs to care for science."[10]

In this letter, the shift in Darwin's line of thought from *Primula* to the current events of the U.S. political crisis—a crisis resulting from Americans' disagreements about the ways in which humans of different races would go on "living mingled"—shows how intimately related in the mind of Darwin are his experiments, his scientific theories, and the conclusions that can be drawn from both. And although Darwin avoided directly addressing the political and theological implications of his work in published writings, his private correspondence shows that he was quite aware of the entwined nature of scientific and social theory that greeted the reception of his ideas in the public realm. In this particular letter to Gray, for instance, Darwin was also clearly aware that the political tensions in an America moving toward civil war created a very different scientific environment for Gray than he himself was experiencing in Britain. These entwinings of the scientific and the social form the starting point for the essays collected in *America's Darwin: Darwinian Theory and U.S. Literary Culture*, as the authors in this volume consider "the specific values and the specific conditions," to borrow John Dewey's words, that influenced responses to Darwinian evolution in the United States.

In considering specific values and specific conditions, we can see that the form, preoccupations, and context of this selected letter from Darwin to Gray enable us to think broadly about the distinctive dimensions of U.S. culture that transformed the meaning of Darwin's theories when employed by American theorists for Ameri-

can purposes; the discussion of this letter is an example of the kind of analysis we have endeavored to foster in this collection of essays. The contours of the letter offer both a snapshot of prevailing U.S. national concerns surrounding evolutionary theory generally and insight into the ways individuals negotiated the "meaning" of evolution to fit their deeply held beliefs. In Gray's case, twin commitments—to scientific investigation and to religious faith—resulted in his effective compromise: theistic evolution. Gray's faith in design as a controlling element in his understanding of evolution highlights the well-established religious zeal in America that helped to shape these convictions and that made it difficult for him to fully embrace Darwin's move away from religious explanations for natural phenomena. At the same time, Gray was a central figure in the maturation of the scientific community in mid- to late nineteenth-century America. Like Darwin, he maintained an extensive network of correspondents, many from scientific outposts on the far-flung edges of the growing nation, and he shepherded the transmission of Darwinian ideas from the scientific elites to the popular culture, even as he modified the evolutionary narrative to suit his individual beliefs. And yet Gray was certainly not alone in his manipulation of evolutionary theory to suit his purposes and beliefs, as many of the essays in this collection demonstrate.

Each of the essays in *America's Darwin* attend to the specific forms that Darwinian evolution took in the United States, and they provide varied accounts of Darwin's shaping influence in the United States. Each contributor gives attention to distinctive social, cultural, and intellectual conditions that affected the reception and dissemination of evolutionary thought from before the publication of *On the Origin of Species* in 1859 to the early years of the twenty-first century. Notably, the essays in this volume engage with the specific details and language of a wide variety of Darwin's texts, treating Darwin's writings as the primary source documents that are essential to comprehending the impact that Darwinian language had on American writers and thinkers. This careful engagement with the texts of evolution enables us to see quite clearly the broad points of acceptance and adoption of evolution in the American scene, as well as those places where writers, reformers, and others reconfigured Darwinian language to suit their individual purposes.

Of course, evolutionary theory itself justifies this adaptive approach, and the contributors to this volume demonstrate the many ways in which writers and others fit themselves to a narrative whose dominant motifs are contingency and uncertainty. Indeed, we might even say that the main argument derived from this collection is that, again in Dewey's Darwin-inspired terminology, the only constant in U.S. responses to evolution is that any "specific value" attributed to evolutionary theory is always subject to the "specific conditions" under which that value is attributed—that the interpretation of evolutionary theory has *always* shifted in relation to prevailing cultural anxieties. For example, we see that Darwin's discussion of shared "expressions" between man and animals inaugurates varied inquiries not

only into the physiological nature of emotion and its influence on the individual, as considered in the essays on William James and Frank Norris by Gregory Eiselein and Melanie Dawson, but also on the nature of animality, cross-species kinship, and posthumanism, as examined in the essays by Nicole M. Merola and Virginia Richter. Likewise, considering life through the evolutionary lens—as marked by contingency, uncertainty, and fluidity—serves both a liberating function, as Heike Schaefer's essay on Dewey and modernist poets demonstrates, and as equally invigorating and potentially destabilizing, as Tina Gianquitto considers in her essay on carnivorous plants in the evolutionary narrative.

America's Darwin is organized around the influence of evolutionary thought on three key themes spanning the mid-nineteenth century to the early twenty-first: aesthetic, spiritual, and intellectual currents; social reform movements; and conceptions of the animal and the limits of species. In addition to examinations of well-known figures in the Darwinian discussion (such as William James, John Dewey, Frank Norris, and Charlotte Perkins Gilman), this collection includes discussions of those who are less readily associated with Darwinian ideas, such as Herman Melville, Edith Wharton, Mary Bradley Lane, and T. C. Boyle. This volume includes essays on the Darwinian influence on modern American poetry, on American feminism and feminist utopian fiction, and even on sentimental flower language and Darwin's plant research. The themes for each part of the collection developed organically out of our examination of current scholarship on Darwin that engages in comprehensive ways with evolutionary science (species distinction, natural and sexual selection, the plant studies, the evolution of emotions, and so on). As noted, the contributors have made conscious efforts to engage with the particular details and language of Darwin's texts as they examine how those texts became translated into the cultural scene, and we have included essays not only that give a sense of the popularity and influence of Darwin's famous works, especially *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life* (1859) and *The Descent of Man, and Selection in Relation to Sex* (1871), but more important that treat some of the less considered or familiar works, especially in the American context. These include *Journal of Researches* (*The Voyage of the Beagle*, 1839), which details Darwin's five years traveling the world aboard the *Beagle*; *Living Cirripedia* (1851), the definitive work on barnacles and the result of eight years of observation and experimentation; *The Variation of Animals and Plants under Domestication* (1868); numerous works relating to Darwin's plant studies, including *The Movements and Habits of Climbing Plants* (1875), *Insectivorous Plants* (1875), *The Different Forms of Flowers on Plants of the Same Species* (1877), and various papers on plants presented to the Linnean Society; *The Expression of the Emotions in Man and Animals* (1872); letters from Darwin's voluminous correspondence with friends and fellow scientists Charles Lyell, Joseph Hooker, Asa Gray, and many others; excerpts from

Notebooks on Transmutation (begun in the 1830s–1840); and what is perhaps Darwin's least-known work, his last volume, on the labor of worms, *The Formation of Vegetable Mould through the Action of Worms* (1881).

THE STRUCTURE OF THIS VOLUME

The first part of *America's Darwin*, "American Spiritual, Aesthetic, and Intellectual Currents," examines the influence of Darwin's theories on broad currents in U.S. spiritual, aesthetic, and intellectual life, as writers in the United States contemplated the new terrains opened up by evolutionary theory. Darwinian evolution notably displaced a world of stable relations between object and meaning in nature and described instead a world marked by uncertainty and contingency, a place of undescribed and blurred boundaries. In many ways, the writers, artists, and intellectuals discussed in this section inhabited the frontiers of thinking about evolution in the American context, whether that was the literal frontier of the entomologist and ardent early defender of Darwinism in the American scene Benjamin Dann Walsh, who found in the raw energy of Illinois nourishment for the spirit of egalitarianism he saw as fundamental to an evolutionary conception of the world, or the spiritual frontier marked by the discovery of early human bones and the immensity of evolutionary time, as expressed in Herman Melville's poems of the early 1870s and John Burroughs's musings on the "long road" of geologic time. The essays in part I also usefully outline the various "Darwinisms" that competed for cultural relevance throughout the nineteenth century and the early twentieth, including theistic evolution, orthogenesis and neo-Lamarckism, mutation theory, and Weismann's germ theory.

Certainly, some early adopters of evolutionary theory expressed ambivalence about the explanatory power of the theory. Some questioned its ability to encompass the unique American narrative, especially the nation's evangelically inflected and teleologically oriented understanding of its "manifest destiny," which flew in the face of a seemingly spiritually vacant, directionless narrative of evolution. Yet, despite the potentially destabilizing nature of the theory, later writers and philosophers, notably James, Dewey, and Wharton, and modernist poets such as Jeffers and Stevens, seized on uncertainty and contingency as a powerful and creative force at the heart of the artist's or philosopher's search for the nature of "truth" in a world of chance and adaptation. John Dewey explains in his 1909 essay, "The Influence of Darwinism on Philosophy," that in the wake of evolutionary theory, philosophy has the responsibility to cease "inquiry after absolute origins and absolute finalities in order to explore specific values and the specific conditions that generate them."[11] Such "conditions" occupy the attentions of Wharton, Jeffers, Stevens, and other authors who sought to understand the essential, evolutionary linkages between scientific imagination and cultural production.

In the first part of this collection, we see how the productive potential of post-Darwinian contingency offered Americans of many stripes options for moving beyond the entrenched institutions and doctrines that defined the Victorian era. The book opens with Gregory Eiselein's "Theorizing Uncertainty," which offers a focused reading of Darwin as a theorist of change, uncertainty, emergence, and difference. William James was among the first American philosophers to embrace Darwin-as-theorist, and Eiselein demonstrates how evolutionary theory shaped James's thinking and philosophy. As Eiselein explains, "Just as natural selection reveals a process of continual change among species, pragmatism demonstrates that there is no unchanging truth. Truth is something that emerges in a process of selection; truth emerges as the idea that works, the way of thinking that adapts itself best to its environment." While James's reliance on Darwinist thinking has been well discussed, Eiselein focuses on how *The Expression of the Emotions in Man and Animals* influenced James's conception of pluralism and pragmatism as rooted in an individual's physiological responses to the uncertain and chancy nature of the world.

Jeff Walker, a geologist, follows a temporal trajectory similar to Eiselein's in "The Long Road"—from roughly the publication of *On the Origin of Species* to the early twentieth century—as he examines the changing nature of John Burroughs's thoughts about evolutionary process and geologic time over the nearly sixty years of his writing career. Yet where James can be seen to embrace contingency and change, Burroughs is more cautious in his responses to evolutionary theory and, as Walker notes, he "resisted the elements of chance that natural selection introduced into the world." Walker's essay covers a critical time (1862–1921) in U.S. responses, and he tracks both the rise and the "eclipse" of Darwinism in the American scene. This period, from Burroughs's first mention of Darwin in an 1862 article in the *Knickerbocker* to his final article on Darwin in 1921, coincides with the era in which alternative theories, such as theistic evolution, Lamarckism, orthogenesis, and mutation, commanded as much attention as did Darwin's ideas. Walker's reading of Burroughs's popular interpretation of Darwinian ideas—and the reception of them—gives a clear sense of how the American public viewed the evolutionary debate.

The naturalist Burroughs represents a tempered response to Darwinian evolution in the American scene. Carol Anelli's essay about Benjamin Walsh, one of the first and foremost entomological authorities in the United States in the mid-nineteenth century, tells a different story—of an adventurous and outspoken scientist passionately committed to defending and promoting Darwinian evolution in the United States. Anelli, an entomologist, charts Walsh's movements in "Darwin and the Prairie Origins of American Entomology" from his days as a poor student at Cambridge, where his marginal position in the social hierarchy led to a fervor for egalitarianism, to his life as a quintessential "western" man on

the Illinois frontier. Walsh, Anelli reveals, was one of the earliest and staunchest defenders of Darwinism in the American scene. He was also an abolitionist and a rugged individualist, and his commitment to the philosophical—as much as to the scientific—underpinnings of evolution directed much of his work in the applied and theoretical aspects of entomology. Walsh's commitment to Darwinism extends his relevance to the modern day, as his original contributions to Darwinian theory have found validation in modern views of cryptic species, the biological species concept, sympatric speciation, and sexual selection in insects.

Where Walsh sought the western frontier for relief from oppressive social structures, Melville, according to Karen Lentz Madison and R. D. Madison, turned to paleontology, geology, and ancient landscapes to ease his spiritual crises. Their essay, "Darwin's Year," examines the evolutionary language of Melville's poems *Clarel* and "The New Ancient of Days," and they argue that the imagery Melville employs in these pieces shares the language and religious implications of evolutionary theory. Evolutionary language, and especially the immensity of geologic time reflected there, provided Melville with metaphors and imagery with which to express his own skepticism and struggle with "the demon time," as the authors write. Important to this argument, and of value to this volume as a whole, is an understanding that "Darwinian pessimism" was well established in America before *Origin* was even published. This picture of the pre-*Origin* cultural landscape is sketched out in the essay's discussion of the geologic researches that contributed both to Darwin's theory and to Melville's troubled response to it. This essay offers a unique contribution to Melville scholars as well: Madison and Madison have produced for this volume the first newly edited version of "The New Ancient of Days" in half a century and the first independent transcription of the poem.

As the nineteenth century progressed, American philosophers and writers found themselves confronting directly notions of contingency and uncertainty—as well as the often disrupting physicality of evolutionary theory. Paul Ohler understands the coming together of the physical dimensions of evolutionary theory with the cultural ones as the "biosocial," and his "Darwinism and the 'Stored Beauty' of Culture" traces in early twentieth-century literature evidence of the broad circulation in the United States of the notion that cultural conditions and forms might be subject to the same Darwinian forces as physical ones are. As Ohler shows, Edith Wharton read widely, and she studied both Darwin's texts and popular iterations of evolutionary theory in late nineteenth-century America. In her short stories, Wharton considers various Darwinisms and contemplates the relative popularity and significance of different kinds of books and ideas in the marketplace. She is guided by the notion of selection pressure as the basis for understanding a cultural product's rise to popularity or acclaim, and her short story collections present an opportunity to understand the extension of natural selection into the cultural sphere.

Heike Schaefer's essay, "A World Which Is Not All In, and Never Will Be," further develops the collection's account of the textual influence of Darwin's works, showing how Darwin's ideas came into the American scene and were then taken up by pragmatist philosophers—most notably John Dewey—who found Darwin's evolutionary theories especially useful for realizing an ideal democratic society. Dewey called for the development of "an experiential mode of knowledge which is at the same time specific, provisional, and relational" that would take into account the perspectives of all involved, thus transforming U.S. society into a participatory democracy. Schaefer argues that these philosophers in turn influenced the emergence of a distinctive American brand of literary modernism, defined by a processual and relational logic. She offers a reading of the poetry of Wallace Stevens and William Carlos Williams through the lens of pragmatist evolutionary thinking, explaining the importance of a Darwin-inspired American pragmatism for the emergence of modernist poetic forms.

Part II of the volume, "Progress and Degeneration, Crisis and Reform," responds to the broadly disseminated concept of evolutionary teleology that, though not endorsed by Darwin's chaotic vision of random evolutionary change, followed the publication of Darwin's works. Americans reacted in great variety to Darwin's theory that species evolve naturally in response to the environment they inhabit, and in evolving leave behind a series of earlier, related biological forms (necessarily recognized as "kin"). Such a process evoked fears of potential regression and atavism, an anxiety that these abandoned characteristics might resurface in later generations. The ideas about environmental selection presented in *On the Origin of Species* and *The Descent of Man* were of course famously taken up in America and manipulated for specific ideological ends by Social Darwinists, who celebrated the notion of "survival of the fittest" in human populations and thus reinforced racist, classist, and sexist inequalities. Many Progressive reformers, on the other hand, rejected humans' subjection to nature's ruthless selections and embraced the theory of evolution as the foundation for a reform approach that would involve manipulating human environments in order to take control of nature's processes of innovation and adaptation. As the essays in part II make clear, these post-Darwin reformist trends had powerful significance for U.S. feminists and socialists who yearned for a more peaceful, egalitarian society.

But others thought that such egalitarian visions were threatened by the retrograde motion that was seemingly embedded in the evolutionary narrative. After all, if a species/culture could progress, as Darwin explained in *Descent*, surely it could just as likely regress, if the environmental conditions were right. Such concerns resulted in an intense focus on the process of "degeneration"—a physical, emotional, spiritual, or cultural decline from an advanced state. Americans contemplated the new emotional and moral terrains opened up by evolutionary theory in terms inflected with particular understandings of "progress" or "degen-

eration": Frank Norris reflected on the universal, primal qualities of the expression of rage; Mary Bradley Lane portrayed Christianity, romantic love, and the nuclear family as primitive atavisms that could endanger a fully refined society; and late nineteenth-century botanists and poets confronted in the plant world seemingly innocuous biological forms that instead evidenced the origins of violent human tendencies—a fund of destructive instinct just beneath the Victorian veneer of civilized human behavior. The essays in part II follow closely the investigation in this collection's first part of the uniquely American take on the aesthetic, spiritual, and intellectual implications of Darwinian theory: What are proper expressions of emotion in a nation that had long privileged piety, restraint, and sympathy as motivators of behavior? Can animal passion play a role in the newly industrialized and scientifically oriented nation? What does embracing our biological past mean for humans' belief in an innate human morality? This part also offers a valuable interrogation of some of Darwin's less well-known works, especially *Expression* and *Insectivorous Plants*.

Part II opens with Kimberly Hamlin's investigation into the reformation of sexual selection at the hands of American utopian writers. In "Sexual Selection and the Economics of Marriage," Hamlin argues that in the U.S. context, the political application of Darwinian ideas is frequently framed as predominantly conservative, epitomized in the survival-of-the-fittest Social Darwinism espoused by William Graham Sumner and others. Yet, at the turn of the twentieth century, reformers across the political spectrum embraced Darwinian evolution and incorporated Darwinian ideas into their platforms for social change. This essay reveals that the Darwinian concept of "female choice" of sexual partner, the predominant reproductive pattern among animals described by Darwin in *The Descent of Man, and Selection in Relation to Sex* (1871), was particularly popular among socialist and feminist reformers. Hamlin claims that Americans became familiar with the revolutionary potential of female choice largely through the utopian writings of Edward Bellamy and Charlotte Perkins Gilman.

In "American Reform Darwinism Meets Russian Mutual Aid," Lydia Fisher extends the discussion of Hamlin's piece as she investigates the transnational dimension of evolutionary theory's influence on feminist utopian fiction. *Mizora* (published in a periodical in 1880–81)—a lesser-known utopian narrative that predates both Bellamy's *Looking Backward* (1888) and Gilman's *Herland* (1915)—presents an idealized vision of a homogeneous, eugenically pure society of women. Examining the separate influences on Mary Bradley Lane's fiction of American reform Darwinism and the Russian concept of "mutual aid," Fisher argues that Lane brings together these two nationally distinct visions of evolutionary theory in her fictional response to the particular needs and pervasive anxieties of a nation with a long history of racial and ethnic conflict, defined by its history of slavery.

While some Americans adapted Darwinian theory to accommodate their uto-

pian visions of feminist reform, others drew from Darwin's evolutionary model new ideas about humanity's animal past and the primitive emotional energies that made atavistic degeneration a promising avenue for revitalizing an overcivilized people. In "Loud Echo," Melanie Dawson takes a new approach to an author much discussed in relation to evolutionary theory, Frank Norris. Dawson examines the influence of Darwin's *Expression* on Norris's portrayal of McTeague as he descends through the realms of civilized emotion and down to a primitive state of rage. In doing so, Norris emphasized not only "primeval" landscapes but also "primal emotional planes," narrowing the distance between humans and other animals. Dawson argues that the emphasis on the physicality of rage exposes the degree to which turn-of-the-century literature interrogated emotional resonances beyond those associated with sympathy and Progressive movements toward social reform.

Tina Gianquitto likewise considers the vanishing distance between humans and other creatures in her essay, "Criminal Botany," which takes as its subject the furor over Darwin's proof that some species of plants lure, trap, kill, and ingest living organisms. Gianquitto examines the remapping of the natural world as a place where seemingly fixed boundaries—between, say, flora and fauna—give way under the pressure of evolutionary theory. She takes as her example insectivorous plants, whose status as neither plant nor animal prompted writers and others to reconfigure moral narratives that had long served to organize humans' view of nature. Carnivorous plants, which simultaneously represent progress (adaptability) and degeneration (atavism), served as an effective "problem object" for late nineteenth-century commentators. Gianquitto's essay, with its concerns about cultural responses to the "boundary-blurring" nature of Darwin's plant studies, serves as an effective bridge to part III of the collection, "The Limits of Species."

The final part of this volume brings together the main concerns raised throughout the collection—existential crises inspired by the glimpse into deep evolutionary time—and presents essays dedicated to the representation of animals and animality in the American literary scene. As Lilian Carswell observes, Darwinian evolution was immediately recognized for its application of the laws of "brute materiality" to human existence, but Darwin's proposition in *The Descent of Man* that there was no fundamental difference between human beings and other animals just as surely encouraged a rethinking of animals in terms previously reserved for the human species. Darwin stresses the idea of affinity between and across species lines, as Nicole M. Merola observes, and gives to nonhuman animals an unprecedented autonomy: in his writings, they become thinking beings, subject not only or simply to the blind drivers of natural selection, but also to the more deliberate mechanisms of sexual selection. Nonhuman animals, Darwin shows, display the power of choice. They share the "human" attributes of emotional expression and simple reasoning. They have desires and act on them. In doing so, they enable

authors, artists, and others to recalculate the supposed difference between human and nonhuman and to blur the boundaries that separate species. In the United States, the blurring of boundaries between species alarmed a population primed to regard eugenics—and the notion of nativism—as a safeguard against impurity and degeneration. It also further disrupted a nation riven by racial and sexual inequalities. Sexuality and sex difference, autonomy and the power of choice, emotional expression and species boundaries all come up in the evolutionary context, triggering deep-seated fears about the nature of American manhood and womanhood, and indeed the nature of the nation.

Gillian Feeley-Harnik's "Bodies, Words, and Works" discusses the representation of animals in the age of Darwin through an examination of the works of Lewis Henry Morgan, a lawyer-ethnographer in Rochester, New York, and the founder of the study of kinship in anthropology. Feeley-Harnik, an anthropologist, investigates the potential influence of Darwin on his American contemporary, focusing on their common interest in the intelligence of animals, to which both attributed adaptive and transformative powers similar to those possessed by humans. Feeley-Harnik presents an integrated analysis of the geobiological and geopolitical dimensions of both Morgan's and Darwin's research on animals to clarify their shared views on how humans and other animals learn and change. Her essay also points to the ways in which their sharp differences on questions of animal intelligence still concern scholars across the sciences and arts, including how (in their terms) to handle "nature" and "artifice" in animal life and how to evaluate the place of "consciousness" in animal life and its consequences for the course of historical and evolutionary change.

Lilian Carswell's contribution, "The Power of Choice," follows Feeley-Harnik's discussion of animal intelligence and the representation of Darwinian animals and analyzes perhaps the most celebrated dog stories ever written: *The Call of the Wild* (1903) and *White Fang* (1906). Carswell situates Jack London's most popular and enduring fictions alongside his lesser-known dog stories and the arguments put forth in "The Other Animals" to examine how London's understanding of Darwinian evolution and the nascent science of comparative psychology form the basis of his representations of animals' subjective experience. Framing these textual arguments in the larger context of early twentieth-century American attitudes toward nature enables Carswell to demonstrate how London juxtaposes this new conception of animal mind with the notion of animals as property, making explicit the political implications of ownership for the treatment of animals and presenting an alternative paradigm for the moral treatment of animals. This paradigm is based not on the concept of kindness but on the recognition of animals' rights to independence and self-determination. In a way that may seem paradoxical, given London's identification with deterministic naturalism, Carswell proposes that the

crux of animal consciousness and the crux of animals' rights are ultimately manifested for London in the same thing: the power of choice.

With Nicole M. Merola's essay, "T. C. Boyle's Neoevolutionary Queer Ecologies," the collection turns to animality studies to understand the limits of species. Merola examines how contemporary American author T. C. Boyle responds to, refracts, and deploys variations on the concept of species as formulated in the work of Charles Darwin, Sigmund Freud, and Gilles Deleuze and Félix Guattari. Merola argues that in two short stories—"Descent of Man" and "Dogology"—Boyle probes how species difference is constituted, where lines of difference are drawn or effaced, how these lines of difference are maintained or subverted, and who benefits from particular conceptions of species and species boundaries. Merola pursues two related avenues of inquiry in her study of Boyle that resound in the collection as a whole: First, how do we think about humans as one among many animals *in* nature, that is, as organisms living in a shared environment? Second, of what does our "animal nature" consist, that is, what does it mean to have an animal nature and how is this related to our conceptions of human nature?

Virginia Richter in "Ape Meets Female Primatologist" follows Merola's discussion of Darwinian discourses on humanity and sexuality with an interrogation of the literary representation of the female primatologist/nonhuman primate (or, simply, woman/ape) configuration in novels by contemporary American writers. Richter's essay focuses on two novels that draw on this well-established woman/ape configuration: Sara Gruen's *Ape House* (2010) and Benjamin Hale's *The Evolution of Bruno Littlemore* (2011). Richter argues that since the rise of primatology as a "female science," the configuration of female primatologist/nonhuman primate has functioned as a nodal point for the scrutiny of the human-animal relationship and related issues: gender relations, the role of cognition and emotion, and anthropomorphism as a valid or invalid cognitive methodology. As Richter observes, the persistence of the woman/ape configuration illustrates both continued anxieties about Darwinian conclusions concerning the limits of species and the surprisingly virulent responses to it in contemporary culture.

A NOTE ON METHODOLOGY

Although the *textual* response to Darwinian evolutionary theory in the United States is the key to *America's Darwin*, as the editors we have also designed the collection as a model of interdisciplinary engagement. *America's Darwin* responds in part to the call, put forth by disability scholar Lennard Davis and others, for the development of a "biocultural model of interdisciplinarity" that will productively link the humanities and the sciences. Davis writes: "To think of science without including a historical and cultural analysis would be like thinking of the literary text

without the surrounding weave of active or dormant discursive knowledges. It is similarly limiting to think of literature—or to debate its properties or existence—without considering the network of meanings we might learn from a scientific perspective."[12] To achieve this end, we have included work from scholars across a range of disciplines: literature, history of science, women's studies, geology, biology, entomology, anthropology. For scientists, considering the cultural reception, application, and (mis)appropriation of scientific findings and terminology can add depth to their understanding of their own research agendas. At the same time, literary scholars can and should contemplate how developing "scientific competence," as Davis puts it, can enrich their understanding of complex cultural moments.

In organizing the book with this interdisciplinarity in mind, we have arranged disparate essays from various fields with the hope that readers will treat the collection not as a group of separate essays on the same general topic, but rather as an intricately integrated whole that tells from diverse perspectives a rich story of Darwin's place in U.S. history and culture. The early essays set up for readers a general knowledge of Darwinian history and theory in the American setting that enriches a reading of the subsequent essays on later Darwinian adaptations. So while the collection can readily be mined for specific interests, we encourage readers to explore the essays together; the interrelations between them are abundant and add much to the significance of each individual piece.

NOTES

1. Charles Darwin to Asa Gray, June 5, [1861], Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-3176 (accessed Nov. 12, 2012).

2. See Charles Darwin to Asa Gray, Sept. 5, [1857], Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2136 (accessed Nov. 19, 2012). This letter and its enclosure are significant for several reasons. On July 4, 1858, Darwin, reeling from the receipt of an abstract from Alfred Russel Wallace that outlined a mechanism of evolution remarkably similar to Darwin's "natural selection," asked Gray to confirm the date of the September 1857 letter, which was important for Darwin's claims of priority in the face of Wallace's conclusions, which he had arrived at independently. A version of this abstract, along with a copy of Darwin's letter to Gray, was presented at the Royal Linnean Society on July 1, 1858. For a detailed discussion of these events, see Janet Browne, *Charles Darwin: The Power of Place* (Princeton, N.J.: Princeton University Press, 2002), 22–53.

3. Charles Darwin to Asa Gray, Nov. 26, [1860], Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2998 (accessed Nov. 19, 2012). Although Darwin's British friends, notably Joseph Hooker, had known about his rejection of design for a while, Darwin finally acknowledged to Gray in this letter: "I grieve to say that I cannot honestly go as far as you do about Design."

4. Janet Browne, "Asa Gray and Charles Darwin: Corresponding Naturalists," *Harvard Papers in Botany* 15, no. 2 (2010): 209–20, 209.

5. Charles Darwin to Asa Gray, Dec. 11, [1861], Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-3342 (accessed Nov. 12, 2012).

6. Charles Darwin, "On the Two Forms, or Dimorphic Condition, in the Species of Primula, and on Their Remarkable Sexual Relations," *Journal of the Proceedings of the Linnean Society of London (Botany)* 6 (1861): 77–96, 94 (read Nov. 21, 1861).

7. Richard Bellon, "Charles Darwin Solves the 'Riddle of the Flower'; or, Why Don't Historians of Biology Know about the Birds and the Bees?," *History of Science* 47, no. 4 (2009): 373–406, 380.

8. Adrian Desmond and James Moore, *Darwin's Sacred Cause: How a Hatred of Slavery Shaped Darwin's Views on Human Evolution* (New York: Houghton Mifflin Harcourt, 2009).

9. Darwin, "On the Two Forms, or Dimorphic Condition, in the Species of Primula," 94.

10. Darwin to Gray, June 5, [1861].

11. John Dewey, "The Influence of Darwinism on Philosophy" (1909), in his *The Influence of Darwin on Philosophy and Other Essays in Contemporary Thought* (New York: Peter Smith, 1951), 13.

12. Lennard J. Davis, "From Culture to Biocultures," in Jay Clayton, Lennard J. Davis, Bernice L, Hausman, Jonathan M. Metzl, and Priscilla Wald, "Forum: Conference Debates. Biocultures: An Emerging Paradigm," *PMLA* 124, no. 3 (May 2009): 947–56, 950.

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GREGORY EISELEIN

Theorizing Uncertainty

Charles Darwin and William James on Emotion

DARWIN'S AMERICAN RECEPTION AND WILLIAM JAMES

THE HISTORY OF DARWIN'S reception in the United States has tended to focus on the religious reaction to evolution, the influence of Social Darwinism on American culture, and "the non-Darwinian revolution" in science.[1] It is true, moreover, that nineteenth-century American culture was more often engaged with the imagined implications of his ideas than with the logic or specifics of his theory. Often his ideas were conscripted in defense of laissez-faire capitalism and deterministic modes of thinking. For many American thinkers and writers, Darwin was an object of attack or derision or an occasion for imaginative work related to sexuality or the beastly nature of human beings. As a popular culture icon, Darwin connotes the loss of religious faith, the importance of sex, the inevitability of progress, the animalism of human beings, the savagery of certain "races," the need to compete in the capitalist marketplace, and so on. These kinds of anti-Darwinian and pro-Darwinian (or Darwinistic) responses are characteristic of the dominant trends in Darwin's American reception.[2]

They do not, however, represent the writers who studied Darwin most carefully or who attended to the details of his theory most thoughtfully. William James, for example, was such a reader of Darwin's works. From the start of his undergraduate career at Harvard in 1861, James studied Darwin carefully and took in many lectures, debates, and discussions about Darwin's theory of natural selection.[3] As a medical student at Harvard in the mid- to late 1860s, James began to write reviews for major periodicals like the *North American Review*, the *Atlantic Monthly*, and the *Nation*. In these earliest publications, he focused on Darwin's texts and related works on evolution by other writers, embracing natural selection and wondering why its principles were not recognized sooner.[4] Yet, despite his immersion in and

support for Darwin's work, James remained a student of Darwin's most famous scientific detractor, Louis Agassiz.

A Harvard professor and creationist, Agassiz was an outspoken critic of monogenesis, the notion supported by evolutionary theory that all humans and all human races have a common descent, and he was an avid defender of the racist theory of polygenesis, the notion that human "races" were permanent types created differently and separately.[5] When Agassiz traveled to Brazil in 1865–66 to study the natural history of the Amazon River region in the hopes of finding glacial evidence of God's hand in the creation and destruction of species, James was invited to join the expedition as a volunteer student assistant. His professor's pronounced anti-Darwinism did not, however, stand in the way of James's study and acceptance of Darwin's theory. In fact, the trip to the Amazon may have reinforced his convictions. "The more I think of Darwin's ideas," he wrote in a letter to his brother Henry James in 1868, "the more weighty do they appear to me, though of course my opinion is worth very little—still, I *believe* that that scoundrel Agassiz is unworthy either intellectually or morally for him to wipe his shoes on, and I find a certain pleasure in yielding to the feeling."[6]

This engagement with Darwin's theory while at Harvard shaped not only James's early writing and thinking but also the direction of his intellectual career. James continued to read Darwin's major works, including the multivolume *Letters of Charles Darwin* edited by his son Francis Darwin.[7] Citations to Darwin appear in many of James's texts. Indeed, one way to understand James is as the writer who brought Darwin's evolutionary principles to James's own fields of psychology and philosophy. His first book, *The Principles of Psychology* (1890), devotes considerable attention to an evolutionary understanding of instinct, while also aiming to explain mental life in ways that are decidedly naturalistic (no recourse to spiritual, supernatural, or other empirically unverifiable causes) and functionalist (attention to how a feature or attribute of consciousness operates, and what it does or how it serves the organism, rather than what it *is*). Thus, *Principles* has been seen as the text that reimagined psychology in terms of Darwin's ideas and brought it as a discipline into the realm of natural sciences.[8] Likewise, James's theory of truth, pragmatism, is an attempt to bring evolutionary theory to philosophy: the ideas that survive because they are the most reliable, testable, and useful are the ones that become "truth."[9] In short, Darwin's writings shaped the way James thought about a range of issues.

Although his study of Darwin's texts influenced James significantly, the popular reception and interpretation of Darwin seems to have had scant effect on him. James could be a fierce opponent of evolution's adversaries like Agassiz, but he was often an even fiercer critic of Darwin's reductive or reactionary supporters, from Herbert Spencer to the Social Darwinists to those who simply revealed a poor comprehension of the theory of natural selection. He rails against their determin-

ism and their unscientific uses of evolution, and he mocks their use of Darwin to develop theories that fundamentally misunderstand the theory of natural selection. The Darwinistic thinker whom James most loved to hate was Spencer. He found Spencer's insistence on seeing consciousness as simply the product of the environment to be a scientifically unsupportable and philosophically undesirable hypothesis because it transformed thinking humans into passive organisms merely responding to their situations as programmed. He did not reject Spencer's biological approach to the study of the mind, however, and James understood well how environments shape organisms, including humans, and their behavior. What James objected to was Spencer's deterministic method of seeing the environment as the sole factor in the shaping of consciousness, an approach that strips the individual human of any agency, creativity, or complexity.[10] Despite these vigorous disagreements with Darwinistic thinkers and despite an occasional disagreement with Darwin himself, few people had a greater impact on James's ideas than Darwin.

In this essay I add to and complicate the story of Darwin's American reception by focusing on how William James responded to Darwin's writings and various debates about natural selection. Specifically, I examine the influence of Darwin's *The Expression of the Emotions in Man and Animals* (1872) on James's work, including his own theory of emotion. The impact of Darwin on American pragmatism is fairly well known. John Dewey made the connection clear early in the twentieth century with his lecture "The Influence of Darwin on Philosophy." In their history of the idea of natural selection, David Depew and Bruce Weber describe pragmatism's project as "reconstructing philosophy, in the light of the Darwinian principle that the mind is a biological adaptation to an environment," while Jonathan Hodge and Gregory Radick note that pragmatism is "the philosophical tradition" that "has drawn most fully and decisively upon Darwinian science."[11] Less often examined are Darwin's ideas on emotional expression and their impact on James.[12] A reading of James's work in light of *Expression* reveals not only important similarities but also the significance and depth of Darwin's contribution to James's theory of emotion. *Expression* appears to have been one of James's favorite books; Bert Bender indicates that James cited it "more than any other Darwinian text."[13]

In terms of their attention to physiology, their literary styles, and their theoretical emphases on adaptation and function, Darwin and James have much in common. Despite these affinities, James was also troubled by the determinism and reductiveness of the various champions of Darwinian theory. He would find his answer to these Darwinistic thinkers and writers in Darwin's theory itself. In *Expression*, James sees Darwin as a careful observer of human and animal behavior and as a theorist of chance, pluralism, and uncertainty. It is this theorist who shaped in important and unmistakable ways James's thinking about emotion and much more.

EMBODIED THEORIES OF EMOTION

Darwin's *The Expression of the Emotions in Man and Animals* paved the way for James's own famous theory of emotions as elaborated in "What Is an Emotion?" (1884), the chapter "The Emotions" in *The Principles of Psychology*, the chapter "Emotion" in *Psychology: Briefer Course* (1892), and "The Physical Basis of Emotion" (1894). James had just begun his career teaching physiology at Harvard when Darwin's book on emotion was published in 1872.[14] The final sentence of that book seems to anticipate James's eventual contribution to the field: "we may conclude that the philosophy of our subject [emotion] . . . deserves still further attention, especially from any able physiologist."[15] James became that "able physiologist" who would devote further attention to the philosophy of emotion.

The most prominent similarity between Darwin's theory of emotion and James's is that both are physical or embodied understandings of emotion. Darwin's focus is not the moral qualities of the emotions or their cognitive, social, cultural, or communicative dimensions. His attention is on the visible physical manifestations of emotion—that is, "the expressions and gestures involuntarily used by man and the lower animals, under the influence of various emotions" (*Expression*, 33). James takes this Darwinian emphasis on the physical to its logical end by identifying emotion with the physical manifestation itself: "emotion here is nothing but the feeling of a bodily state, and it has a purely bodily cause."[16] James asserts that an emotion is not a cognitive state that then causes a bodily expression. Instead, he reverses this usual order: "*the bodily changes follow directly the perception of the exciting fact, and . . . our feeling of the same changes as they occur is the emotion*" (*Principles*, 2:1065, emphasis in original). He goes on to explain:

> Common-sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble because we are sorry, angry, or fearful, as the case may be. Without the bodily states following on the perception, the latter would be purely cognitive in form, pale, colorless, destitute of emotional warmth. We might then see the bear and judge it best to run, receive the insult and deem it right to strike, but we should not actually *feel* afraid or angry. (Ibid., 2:1065–66, emphasis in original)

The crying itself, this embodied affective activity and the feeling of this bodily activity—and not a cognitive state of melancholy or sadness—is the key to James's theory of emotion.

Darwin and James were not the first to study the physical aspect of emotions. Both refer back to the earlier work of a painter, Charles Bell's *Essays on the Anatomy of Expression in Painting* (1806).[17] Bell's book was a work of natural theology that attempted to illustrate how God had designed emotional expression as a way to communicate shame and other moral feelings. He examined emotion as a way to illustrate divine creation and to differentiate sharply humans and their unique emotional, mental, and moral capacities from animals.[18] Darwin admired Bell for his careful observations and his attempt to treat the study of emotional expression as "a branch of science" (*Expression*, 7). Darwin's aim in *Expression*, however, was to show the evolutionary connections between animal expression and human expression and to establish the study of emotion as a fully scientific project, not a religious or moral one, by emphasizing the physical and by using naturalistic explanations of those physical manifestations. James extends Darwin's emphasis on the physical by putting the embodied materialization of emotion at the very center of the definition of emotion itself.

For both thinkers, then, "disembodied human emotion is a nonentity" (*Principles*, 2:1068). This inextricable connection between affect and the body led both men to an understanding of the ways that the physical expression of emotion intensifies the feeling of it. In other words, one doesn't "release" anger by yelling and screaming, punching and fighting, or cursing and belittling. Giving full expression to one's emotion doesn't purge them, for Darwin or for James. It is just the opposite. Heightened expression amplifies or rehearses the emotional reaction. It is a kind of practice in feeling a certain way. Darwin explains this in his conclusion: "The free expression by outward signs of an emotion intensifies it. . . . The repression . . . of all outward signs softens our emotions. He who gives way to violent gestures will increase his rage; he who does not control the signs of fear will experience fear in a greater degree; and he who remains passive when overwhelmed with grief loses his best chance of recovering elasticity of mind" (*Expression*, 359–60). In an earlier chapter, he emphasizes a similar point: "Most of our emotions are so closely connected with their expression, that they hardly exist if the body remains passive" (234).

James adopts this view but uses it to weaken further the usual distinction between emotion and expression (or feeling and action): "Action seems to follow feeling, but really action and feeling go together."[19] Continuing in this piece, "The Gospel of Relaxation," one of his student lectures from *Talks to Teachers on Psychology and to Students on Some of Life's Ideals* (1899), he puts to practical use the notion that expression amplifies the feeling of an emotion: "Thus the sovereign voluntary path to cheerfulness, if our spontaneous cheerfulness be lost, is to sit up cheerfully, to look round cheerfully, and to act and speak as if cheerfulness were already there. If such conduct does not make you soon feel cheerful, nothing else on that occasion can. So to feel brave, act as if we *were* brave."[20] Just as Darwin

believes that "violent gestures" can only lead to an intensification of anger, James sees sitting up straight and smiling as the "voluntary path to cheerfulness, if our spontaneous cheerfulness be lost." Darwin's point is that the connections between the body and emotion are so close as to be inseparable, and James clearly uses this notion of embodied emotion as the foundation for his own theory. Even as James extends the implications of this idea into the realm of everyday advice for students, we can see already implicit in Darwin's work this shared belief that the way to manage one's emotions is first to understand their connection to the body and then to adjust one's body accordingly.

Beyond their common emphasis on the role of the body, Darwin and James also share important stylistic qualities. Both writers make frequent use of anecdotes, introspection, and the citation of a wide variety of sources from the sciences and the arts. In their work on emotion, however, it may be their similar use of thick description that stands out. The vivid specifics of *Expression* make many passages seem as if they were moments from a Victorian novel. In his discussion of sadness and distress, for example, Darwin speaks generally but with vibrant detail: "Persons suffering from excessive grief often seek relief by violent and almost frantic movements . . . but when their suffering is somewhat mitigated, yet prolonged, they no longer wish for action, but remain motionless and passive, or may occasionally rock themselves to and fro. The circulation becomes languid; the face pale; the muscles flaccid; the eyelids droop; the head hangs on the contracted chest; the lips, cheeks, and lower jaw all sink downwards from their own weight" (*Expression*, 176–77). Although *Expression* is filled with photographs and illustrations depicting the physical qualities of emotional expression, Darwin also relies on these detailed prose descriptions, which are essential evidence for his argument. The visual images can capture what the emotion looks like at a single moment frozen in time, but they do not capture what the emotion feels like (or what it sounds like, tastes like, or smells like) or what the emotion looks like in action. Imaginative, vivid, often literary prose can. For similar reasons, James also makes use of detailed description: "What kind of an emotion of fear would be left if the feeling neither of quickened heart-beats nor of shallow breathing, neither of trembling lips nor of weakened limbs, neither of goose-flesh nor of visceral stirrings, were present, it is quite impossible for me to think. Can one fancy the state of rage and picture no ebullition in the chest, no flushing of the face, no dilatation of the nostrils, no clenching of the teeth, no impulse to vigorous action, but in their stead limp muscles, calm breathing, and a placid face?" (*Principles*, 2:1067–68). Accounting for affect seems to require concrete prose accounts, energetic specifications, and depictions of the emotions examined. To create these accounts, Darwin combines nouns denoting parts of the body with active verbs: "eyelids droop" and "the head hangs," "the chest heaves" and "nostrils quiver." James seems more inclined to link his nouns to participles to create images of "clenching" teeth and "flushing" faces.

Still, the descriptive vigor is similar. So perhaps is the reason for turning to literary prose. In attempting to explain and help readers conceive and understand scientific theories that countered widely accepted or commonsense views of their day, these scientists sometimes relied on the tools that novelists use to imagine new worlds.[21]

While both writers rely on vivid prose descriptions to capture the emotions studied, both also seem to doubt at times the adequacy of their own words. In such moments, they turn to other writers for help. When describing the breathing of an angry person, for instance, Darwin relies on lines from the "Merlin and Vivien" section of *Idylls of the King*: "The respiration is likewise affected; the chest heaves, and the dilated nostrils quiver. As Tennyson writes, 'sharp breaths of anger puffed her fairy nostrils out'" (*Expression*, 236). To describe the impulse for hiding that materializes when experiencing shame, Darwin cites Shakespeare, who "makes Marcus (*Titus Andronicus*, ii, 5) say to his niece, 'Ah! how thou turn'st away thy face for shame'" (320).[22] He uses Homer to help capture the intensity and complexity of joy (214), George Eliot to illustrate unexpected fear in a child (354), and so on. James also seems to feel that his own descriptive powers are sometimes insufficient, and he too turns to vivid, illuminating passages crafted by other writers. In a description of fear from *Principles*, for instance, James invokes Darwin, using a haunting passage from *Expression* that dramatically renders the terrified body:

> Fear is often preceded by astonishment. . . . In both cases the eyes and mouth are widely opened, and the eyebrows raised. . . . The heart beats quickly and violently, so that it palpitates or knocks against the ribs. . . . the skin instantly becomes pale, as during incipient faintness. . . . The hairs also on the skin stand erect; and the superficial muscles shiver. . . . The breathing is hurried. The salivary glands act imperfectly; the mouth becomes dry. . . . One of the best-marked symptoms is the trembling of all the muscles of the body; and this is often first seen in the lips. From this cause, and from the dryness of the mouth, the voice becomes husky or indistinct, or may altogether fail. (*Expression*, 290–91, as qtd. in *Principles*, 2:1062)

While both Darwin and James appear to encounter the limits of their own literary talent when writing about affect, neither abandons the use of prose description to capture the emotions they want to examine. Instead, understanding well the power of language to capture vividly the evidence they need to support their theories, both quote the writings of other authors, literary and scientific, who best depict the physical manifestations that constitute the emotion being examined.

In addition to their effective use of rich, concrete prose descriptions, both writers also emphasize the importance of theory to the study of emotion. James in particular is dismayed by the extent to which earlier work on emotion seems to lack any abstract or general explanatory power. In *Psychology: Briefer Course*, he considers the "German psychological text-books" to be "nothing but dictionaries of synonyms when it comes to the chapter on Emotion" and says candidly that

"there is little psychological writing about the emotions which is not merely descriptive."[23] James realized that to advance psychology as a discipline, researchers in the field would need to do more than label emotions: "there are limits to the profitable elaboration of the obvious" (*Psychology*, 351). What he calls for instead is a theory, a system for explaining or accounting for the emotions, a hypothesis that makes sense of the available empirical evidence and that could be confirmed by that evidence. He insists on the need for a theory that will help not only describe but explain emotion, something that will provide "a central point of view, or a deductive or generative principle" (ibid.). James articulates "the vital point of [his] whole theory" as an attempt to understand how an emotion is "*the feelings of its bodily symptoms*" (355, emphasis in original). There is "no 'mind-stuff' out of which the emotion can be constituted" (ibid.). While he is certainly using the word "theory" in a typical nineteenth-century sense to designate a well-developed hypothesis supported by known facts, James also uses the word "theory" here to describe his attempt to move beyond mere naming and designating, to get "to another logical level" or "to ever deeper levels" of understanding (351).

Darwin was the other great theorist of emotion in the nineteenth century, and he did not customarily like to separate scientific observation, experiment, and theory. According to his son Francis Darwin, "He often said that no one could be a good observer unless he was an active theoriser."[24] Although he uses the term "theory" throughout *Expression*, the most significant articulation of Darwin's theory of emotion appears in the opening three chapters on "General Principles," where he attempts to use three core ideas "to account for most of the expressions and gestures involuntarily used by man and the lower animals, under the influence of various emotions and sensations" (*Expression*, 33). The first of these principles suggests that emotional expressions derive from specific useful or "serviceable" (34) actions that have become deeply habitual and associated with "certain states of mind" (ibid.); such actions over time become inheritable. While the origin of some expressions can be traced to their original service or usefulness, others are best explained as the "antithesis" (55) of such emotional expressions; Darwin's second principle theorizes that "when a directly opposite state of mind is induced," the body generates a "performance of movements of a directly opposite nature" (ibid.). His third principle simply emphasizes "the direct action of the excited nervous system on the body" (69). Taken together, these three principles help us to comprehend the origins, the universality, and the involuntary power of emotion and emotional expression. They also, in Darwin's view, provide further support for evolutionary thinking and further invalidation of the era's scientific racism: "the study of the theory of expression confirms to a certain limited extent the conclusion that man is derived from some lower animal form, and supports the belief of the specific or sub-specific unity of the several races" (360). In doing so, Darwin's work moves well beyond mere description and the tedious cataloging of definitions.

At the core of Darwin's and James's theories of emotion is the idea of usefulness. The origin of emotional expression is best understood, they believe, in terms of the functional benefit it provides the creature (or, at least, provided it at one time in its evolutionary development). Darwin articulates this view most clearly in his conception of "serviceable actions" (*Expression*, 33)—movements, gestures, or behaviors that offer some useful benefit to the organism in a particular emotional state. Thus, for example, in his discussion of distress and suffering, Darwin explains that the eyes of crying infants shut "to protect the eyes from becoming too much gorged with blood" (148). He goes on to explain that in all kinds of "violent expiration" (161), such as sneezing, loud laughing, or screaming in distress, the veins and arteries in the face dilate and blood pressure there increases. To keep the blood vessels in the eyes from rupturing during such emotional states, the eyes involuntarily close. Thus, Darwin concludes, "the firm closure of the eyelids during the screaming of children is an action full of meaning and real service" (163). Although many physical expressions have no immediate or direct usefulness, their evolutionary origin can be traced to a time and circumstance when the act was of use. In explaining anger and indignation, for example, Darwin describes a range of movements that all suggest preparation for a physical fight, "an attitude ready for attacking or striking [an] enemy" (242). The chest expands, fists clench, nostrils flare to allow the "free indraught of air" (ibid.) in anticipation of physical exertion, and the heart rate rises, sending blood to the extremities for the fight. Over time, these physical motions have become deeply ingrained or associated with this specific emotional state, so that even when individuals have no expectation of engaging in actual physical combat, hands still clench, nostrils flare, and hearts race.

No doubt influenced by Darwin's *Expression*, James also accepts the view that many affective expressions should be explained in terms of their usefulness or former usefulness. In *Psychology: Briefer Course*, James writes: "Some movements of expression can be accounted for as *weakened repetitions of movements which formerly* (when they were stronger) *were of utility to the subject*. Others are similarly weakened repetitions of movements which under other conditions were *physiologically necessary concomitants of the useful movements*" (362, emphases in original). James then cites one of Darwin's examples to illustrate the idea: "So slight a symptom as the snarl or sneer, the one-sided uncovering of the upper teeth, is accounted for by Darwin as a survival from the time when our ancestors had large canines, and unfleshed them (as dogs now do) for attack" (362–63). Just as our evolutionary ancestors did, we sneer when angry as if to prepare our teeth for battle, even now when we have no intention of biting.

Darwin's notion of serviceable actions had considerable influence on not only James's theory of emotion but also James's whole way of thinking. In his theory of pragmatism, for example, James famously comes to understand truth in terms of its usefulness. When examining the truth of an idea, pragmatism evaluates the idea

in terms of questions such as "what concrete difference will its being true make in any one's actual life?"[25] True ideas are those that have proven themselves useful and valid over time, and true ideas are not so much eternal givens as productive tools. As he explains in *Pragmatism* (1907), "the possession of true thoughts means everywhere the possession of invaluable instruments of action."[26] Moreover, just as natural selection reveals a process of continual change among species, pragmatism demonstrates that there is no unchanging truth. Truth is something that emerges in a process of selection; truth emerges as the idea that works, the way of thinking that adapts itself best to its environment. Truth, for James, is something that "*happens* to an idea."[27] If our ideas don't work or don't help us cope with our environments (that is, if they don't explain much or can't be validated), they become extinct, replaced by fitter or better adapted, more useful truths. Thus, both James's pragmatism and his theory of emotion reveal an understanding of, engagement with, and convergence with Darwin's thinking at a fundamental level.

CONTINGENCY, PLURALISM, AND UNCERTAINTY

Despite the similarities between James's theory of emotion and Darwin's, James could also be a critic at times of Darwin and his theory of evolution.[28] In one of his earliest published works, an anonymous 1868 book review of Darwin's *The Variation of Animals and Plants under Domestication*, James discusses with some fascination the notion of reversion, the reemergence of traits in children not seen in the parents but seen in their ancestors. Ultimately, however, he finds Darwin's explanation of the concept to be circular: "the nature of the reasoning on which Darwin's hypothesis is based . . . is nowhere of strictly logical cogency, for the conclusions drawn from certain premises are assumed in their turn as true, in order to make those premises seem more probable."[29] His concern here seems to be a lack of empirical evidence, "a physically strict proof of it, complete in every link."[30] Later in his career, in discussing Darwin's theory of emotion specifically, James raises doubts about the principle of antithesis, seeming to join other critics who considered it "the least successful of Darwin's speculations on this subject [emotion]" (*Principles*, 2:1097). He also thinks that Darwin pays inadequate attention to what he calls "the principle of *reacting similarly to analogous-feeling stimuli*" (2:1094, emphasis in original). The physical movements associated with disgust, for example, begin with negative responses to what can be smelled and tasted but, by analogy, seem transferred to moral, social, and aesthetic objects. Darwin clearly thought that disgust originated with stomach-churning reactions related to taste and smell but became associated with responses to other kinds of offenses. Indeed, the first illustration of contempt/disgust in *Expression* is a picture of a young woman "tearing up the photograph of a despised lover" (251). James does not criticize this idea per se. Instead, perhaps slightly disappointed with Darwin's

failure to describe or explain adequately the genesis of such expressions, he simply insists that it is a "principle, to which Darwin perhaps hardly does sufficient justice" (*Principles*, 2:1094).

Despite his identification of apparent insufficiencies in Darwin's work, James is, in general, far less critical of Darwin and far more concerned with the abuses of his theory by others. In *The Principles of Psychology*, for example, he suggests that the way an "ordinary evolutionist" would treat important cognitive questions is "exceedingly simple-minded" (2:1226–27). The term "ordinary evolutionist" seems to mean here not Darwin himself or someone who understands the theory of natural selection but rather someone who distorts or misuses Darwin's theory in the service of a reductionist view of the mind. In a review of Henry T. Finck's *Romantic Love and Personal Beauty* (1887), James scorns the book's unscientific (and sexist) use of evolutionary theory, citing it as an unfortunate example of "the somewhat fatal effect of Darwinian ideas in letting loose the springs of irresponsible theorizing."[31] The Darwinistic thinker James most often criticized was Herbert Spencer. In "Great Men and Their Environment" (1881), one of his most important engagements with evolutionary theory, James refers to Spencer's "'philosophy' of evolution" as "a metaphysical creed, and nothing else," which permits James to suggest that one might want not so much to disprove Spencer's theory as to "raise [one's] voice in protest against its disguising itself in 'scientific' plumes" ("Great Men," 645, 646).

James's disparagement of Spencer and other "irresponsible" or "simple-minded" Darwinistic thinkers is closely connected to his dislike of deterministic philosophies. When discussing his theory of emotion in *Principles*, for example, James asks that his ideas not be confused with a purely materialist approach that might see emotions as nothing but physical events determined by natural causes over which an individual has little control. "Let not this view be called materialistic" (2:1068), he says of his own theory. Here and elsewhere, James distinguishes his theory of emotion from materialism because he associates the materialist view with a denial of free will and a rejection of the idea that individuals can actively shape their own worlds. He links materialism to determinism and sees both as extreme positions that deny the possibility that consciousness can be active, effectual, creative, and in some respects self-determining.[32] In "Remarks on Spencer's Definition of Mind as Correspondence" (1878), for example, he takes issue with Spencer's principle for understanding "the entire process of mental evolution" as simply the "*adjustment of inner to outer relations*."[33] Spencer sees the outer environment shaping the inner mind, while James thinks that "the knower is an actor" whose cognitive processes and physical actions "help to *make* the truth which they declare."[34] For James, the proof of this view can be found in, among other places, the genius of "great men" who reshaped their societies: "The mutations of societies, then, from generation to generation, are in the main due directly or indirectly to the acts or the examples

of individuals whose genius was so adapted to the receptivities of the moment, or whose accidental position of authority was so critical that they became ferments, initiators of movements, setters of precedent or fashion, centers of corruption, or destroyers of other persons, whose gifts, had they had free play, would have led society in another direction" ("Great Men," 626). Holding to his belief in human agency and free will, James distances himself from Spencer, materialism, and determinism, from doctrines that would suggest that the material world or our environments wholly shape our thoughts, feelings, and choices. Suspicious of simplistic or dogmatic explanations in general, James criticizes Spencer's theory for being a single-minded "formula" that purports to explain the "'entire process of mental evolution'" but ignores "all sentiments, all æsthetic impulses, all religious emotions and personal affections" as well as "an immense number of emotional judgments."[35]

James finds answers to his concerns about determinism and Darwinistic thinking as well as a scientific grounding for his own ideas about "indeterminism" in the work of Darwin himself. Knowing that deterministic views are inconsistent with Darwin and with natural science in general, James reminds us that "naturalists know well enough how indeterminate the harmonies between a fauna and its environment are" ("Great Men," 635). The scientific observer realizes that there are, in fact, various ways that an organism might interact with its environment: "An animal may better his chances of existence in either of many ways,—growing aquatic, arboreal, or subterranean; small and swift, or massive and bulky; spiny, horny, slimy, or venomous; more timid or more pugnacious; more cunning or more fertile of offspring; more gregarious or more solitary; or in other ways besides,—and any one of these ways may suit him to many widely different environments" (ibid.). Likewise, when addressing the origins of emotional reactions or expressions, James wants to multiply possibilities and explanations, and he insists that even several principles might not adequately capture affective phenomena: "there remain many reactions which cannot be explained at all" (*Principles*, 2:1095). In doing so, he embraces what he calls elsewhere "indeterminism," a "theory devoid either of transparency or of stability," which represents "a pluralistic, restless universe, in which no single point of view can ever take in the whole scene."[36] As he attempts to elaborate, support, and use his theory of indeterminism, he finds in Darwin's theory three important elements that become a part of his own views: an emphasis on chance, an interest in plural explanations, and an understanding of the uncertainty of our knowledge. These three ideas help James to conceptualize the convergence of Darwinian ideas with his own ideas about emotion and, more generally, his own antifoundational approach to theory.

James's understanding of chance draws powerfully from Darwin's theory of natural selection. The process of evolution, as understood by Darwin and modern biologists, depends vitally upon variation, the differences among individuals within

a species and the small amount of what we would call genetic change that occurs from generation to generation within a species. The variations that promote the adaptability of the species at that moment and in that particular environment are selected gradually over a long period of time and become the evolutionary changes in the features or traits of the species as a whole. Darwin understood that variations involve an element of chance or unpredictability, that variants appear spontaneously in all species, and that the emergence of these variants are not directly related to survivability, adaptability, or selection. Because, in the words of Stephen Jay Gould, "variation is not inherently directed towards adaptation," evolutionary change fundamentally involves an element of chance or randomness.[37] In Darwin's theory, natural selection leads to changes in adaptability that benefit the species as a whole, but it is also a stochastic process in which each step is random in its direction. Some features in a species may have improved adaptability at one point, yet those features persist even after their adaptive benefit has passed. The fact that not all evolved features provide benefit to the organism suggests that historically contingent developments, with no strict adaptive use or deterministic purpose, play a role in the evolution of life. Likewise, random or accidental events—such as geological catastrophes, meteors, mass extinctions—also undoubtedly affect the course of the history of life on our planet. Thus, Darwin, according to Ernst Mayr, "showed how strong a role in evolution was played by chance."[38] In the nineteenth century, this aspect of Darwin's work led the distinguished English scientist John Herschel to label the theory of natural selection "the law of higgledy-piggledy."[39] Darwin was hurt by this caricature of his ideas, and he seems to have been pained at times by the ways in which his findings and their implications about the role of chance were at odds with his era's determinism and emphasis on natural laws.[40] Nevertheless, now and in the nineteenth century, both critics like Herschel and advocates like James understood well that chance plays an important part in the theory of natural selection.

In *Expression* too Darwin acknowledges the role of contingency and never tries to explain everything solely and deterministically in terms of adaptation.[41] Although his emphasis on chance in *Expression* is not simply a reaction to deterministic evolutionary theorists who want to explain everything in terms of its adaptive value, Darwin does devote time to examining emotional expressions that have contingent or seemingly accidental origins. He is interested, for example, in emotional expressions that are simply "the purposeless remnant of an habitual movement" (50). He talks about kingfishers who "kill" a piece of raw (dead) meat as if it were a live fish (53) and dogs who play with their food (50). Such examples of inherited emotional expression with no apparent adaptive value illustrate the place of contingency in Darwinian theory, or what Gould calls "the discordance between historical origin and current utility."[42] These examples as well as the larger place of chance in the theory of evolution alerted James to the role of chance in his own

theory of emotion and to the larger possibility of developing a naturalistic, scientific theory of emotions that was not deterministic in its ideology or implications. Thus, when reading Darwin, he seized on the biologist's emphasis on contingency and accident as powerful factors in the development of life. According to James, "Darwin opened our minds to the power of chance-happenings to bring forth 'fit' results if only they have time to add themselves together."[43]

Although Darwin may have felt ambivalent at times about recognizing the role of chance in his own theory, James did not. Indeed, James distinguishes between those who understand how natural selection works and how it includes a significant role for chance (such as Darwin) and those who distort evolutionary theory to make it conform to the reigning determinism in scientific thought (such as Spencer). In "Great Men and Their Environment," for example, James's primary purpose might be described as an attempt to dispel the idea that "'there are no accidents'" (618), a view he associates with Spencer and other deterministic Darwinians (619). In this essay and throughout his work, James is drawn to phenomena that can only be explained by recourse to the notion of chance or accident—causes or situations so unique in their convergence of factors, so unstable or volatile in their emergence, so unexpected, and so unplanned or undetermined as to resist easy assimilation into a larger pattern or mode of understanding. Noting the lack of direct connection between past emergence and current use, he highlights the contingent origin of much that is part of our emotional lives: "in an organism as complex as the nervous system there *must* be many such reactions, incidental to others evolved for utility's sake, but which would never themselves have been evolved independently, for any utility they might possess" (*Principles*, 2:1097, emphasis in original). When considering emotional reactions such as "sea-sickness, ticklishness, shyness, the love of music, of the various intoxicants, nay, the entire æsthetic life of man," James insists that their origin must be "accidental," adding, "It would be foolish to suppose that none of the reactions called emotional could have arisen in this *quasi*-accidental way" (*Psychology*, 365, emphasis in original).

James's understanding of chance is closely linked not only to historical contingency but also to Darwin's conception of variation or, as James likes to put it, "spontaneous variations."[44] In "Great Men and Their Environment," for instance, he counters deterministic appropriations of evolutionary theory, the "no accidents" theories, by embracing variation: "The causes of production of great men lie in a sphere wholly inaccessible to the social philosopher. He must simply accept geniuses as data, just as Darwin accepts his spontaneous variations. . . . the relation of the visible environment to the great man is in the main exactly what it is to the 'variation' in the Darwinian philosophy" (625). Likewise, the sublime creative works and the brilliant ideas of these great thinkers, leaders, scientists, and artists are all instances of impossible-to-predict "spontaneous variation in the strictest sense of the term" (642). As James explains: "It flashes out of one brain,

and no other, because the instability of that brain is such as to tip and upset itself in just that particular direction. But the important thing to notice is that the good flashes and the bad flashes, the triumphant hypotheses and the absurd conceits, are on an exact equality in respect of their origin" (642–43). Such variations are the result of chance or unpredictable change. Darwin's theory can explain how and why such chance events become useful, are preserved, and handed down. It does not account, however, for the original variation. For James, this is a point so fundamental and so obvious that having to explain it is a kind of embarrassment. In an 1887 review for the *Nation*, James suggests that readers who don't know such key ideas in the theory of natural selection are probably not "worth writing for at all."[45] "Persons as densely ignorant . . . of the fact that Darwin never professed to explain the original variations, but only to account for their accumulation and survival," he laments, "can hardly be saved."[46]

Just as contingency or chance are key aspects of James's and Darwin's thinking, so are pluralism and uncertainty. James is, famously, a thoroughgoing pluralist, who sees a "multiverse" not a universe, who sees truth throughout the varieties of religious experience, who knows that "things are 'with' one another in many ways, but nothing includes everything," who knows reality is always "unreduced to unity."[47] Thus, it is not surprising that James imagines an almost infinite variety in the kinds, intensities, and experiences of emotion: "*there is no limit to the number of possible different emotions which may exist, and . . . the emotions of different individuals may vary indefinitely*" (*Psychology*, 357, emphasis in original). Moreover, his discussion of emotion in *Psychology: Briefer Course* emphasizes expressions of feeling that resist easy categorization or explanation—affective reactions such as a dry mouth, a lump in the throat, ticklishness, and so on (364–65).

Darwin's theory of natural selection is founded on a similar notion of a seemingly infinite number of tiny individual differences, which over time establish the constantly changing forms we know as species. Moreover, while he is often associated with one great idea, his theory of natural selection, Darwin embraces three different explanatory principles in *Expression*: the principle of serviceable habits, the principle of antithesis, and the principle of "direct action of the nervous system" (34). Indeed, Darwin is so prepared to embrace multiple ways of understanding the emotions that he seems at times to adopt explanations that are inconsistent with his own theory of natural selection. In the development of his ideas about natural selection in *On the Origin of Species*, he rejected Jean-Baptiste Lamarck's theory that habits or traits acquired during an organism's life could be inherited by its offspring. Somewhat surprisingly, *Expression* seems to accept the idea that acquired characteristics could be inherited: "from what we know of inheritance, there is nothing improbable in the transmission of a habit to the offspring at an earlier age than that at which it was first acquired by the parents" (45).[48] Although Darwin had defined his own theory of natural selection in opposition to

Lamarck's, describing the notion of inheritance of acquired characteristics as "veritable rubbish,"[49] *Expression* allows the Lamarckian hypothesis to coexist alongside other explanations of emotional expression.

Finally, it is important to note that James's hesitation about the certainty of our philosophical or scientific explanations has an analogue in Darwin's work. In James's chapter "The Emotions" in *Principles*, in a section called "Difficulty of Testing the Theory Experimentally," he emphasizes that his theory is "so far only a hypothesis, only *possibly* a true conception, and . . . much is lacking to its definitive proof" (2:1070, emphasis in original). Near the end of this chapter, James again reminds us of the uncertainties in his theory: "the reader will himself have felt how conjectural and fallible in some of the instances the explanation is—there remain many reactions which cannot be explained at all" (2:1095).

Darwin's theory of emotion provides similar reminders. A characteristic move by Darwin is to preface his suggestive extensions of evolutionary thinking with an identification of what remains unproven. For example, before wondering if the barking of dogs emerged because of their coevolution "with so loquacious an animal as man," Darwin points out the limits of our empirical knowledge of the subject: "How the barking of the dog . . . was first learnt, we do not know" (*Expression*, 352). These qualifications identify that which eludes our knowing, and they accentuate the more general emphasis that "very many points in the theory of expression remain inexplicable" (87).

Darwin's acceptance of uncertainty and plural explanations had an undeniable influence on the development of James's theory, and James's reading of Darwin clearly helped to define and inform James's worldview, including notably his theory of emotion. As Gillian Beer has demonstrated, Darwin's theory does "not resolve to a single significance nor yield a single pattern," but instead takes us into an intellectual world of multiplicity and abundance, "into profusion and extension."[50] Such a view clearly appealed to James, who in a crisis early in his life learned to embrace uncertainty and see it as a source of freedom and action.[51] Darwin and James embraced uncertainty and pluralism for different reasons, however. James was philosophically committed to pluralism in a way that Darwin was not. Likewise, although he may have accepted uncertainty as a way to cope with issues related to free will, James's later dedication to uncertainty functions as an answer to determinism and as the underpinning for a commitment to tolerance as a moral ideal. In his *Talks to Teachers on Psychology and to Students on Some of Life's Ideals*, for example, he reminds us that life is full of "values and meanings which we fail to realize because of our external and insensible point of view," and the recognition of our "blindness" to these meanings is "the basis of all our tolerance, social, religious, and political."[52] Darwin's emphasis on uncertainty, on the other hand, may have been rooted as much in his characteristic modesty, anxiety, and worry about his scientific work as in his clarity about the limits of what the available data

tell us.[53] Despite such motivational differences, Darwin's theory provides a model for James's work not only in its physiological and naturalistic approach to the study of emotion, but also in its introduction of roles for chance, pluralism, and uncertainty. While others were misusing Darwin's theory to banish unpredictability and to make explanations simplistic or deterministic, James understood well that Darwin's ideas were themselves a powerful response to reductionism, determinism, and dogmatism. Moreover, despite the many misappropriations of Darwin's work—which often turned Darwin's ideas into the deterministic and reductive opposite of what they were—James understood clearly that the distorted versions of Darwin were not Darwin at all. The best counter to the misconceptions and misappropriations, James realized, was a return to Darwin himself and to his theorization of the role of chance and the place of pluralism and uncertainty in science.

CONCLUSION: EVOLUTIONARY THEORY AND INDETERMINISM

From its initial reception in the mid-nineteenth century to the present, Darwin's work has drawn attention, positive and negative, from those with fixed or dogmatic ideas about the natural, spiritual, and social worlds. He has been the object of attack from a range of positions, including nineteenth-century scientists who rejected evolution, like Agassiz, and twenty-first-century religious proponents of intelligent design. Darwin's supporters have also been surprisingly inflexible at times. In the nineteenth century, the Social Darwinists and the utilitarian Spencer were deterministic in their thinking and pontifical in their rhetoric. Likewise, in our own era, a number of Darwin's advocates—from sociobiologists like E. O. Wilson and Richard Dawkins to literary Darwinists like Joseph Carroll and Brian Boyd—have espoused seemingly deterministic ways of thinking, in which one can detect a self-satisfaction about the irrefutability of the position being advanced. These writers have often relied, moreover, on a rhetoric that is polemical and dismissive. In Carroll's *Literary Darwinism*, for example, Darwin becomes the solid, scientific answer to the misguided indeterminacy that plagues the humanities.[54]

Yet such perspectives are hardly the only ways to understand and interpret Darwin's work and its significance, and some critics have persuasively suggested that Darwin's ideas resist the dogmatic appropriation of them by his various advocates. In *The Nick of Time: Politics, Evolution, and the Untimely*, Elizabeth Grosz offers this view: "Darwin provided a model of time and development that refuses any pregiven aim, goal, or destination for natural selection. This already serves to differentiate him from virtually all of his followers."[55] While Darwin differs in this respect from perhaps "virtually all of his followers," at least one of his readers, William James, shared his anti-teleological orientation and his emphasis on indeterminism, uncertainty, pluralism, and chance.

James was not, of course, the most devout of Darwin's followers. He expressed doubts about Darwin's work, identified incomplete explanations, and disagreed with many of Darwin's more adamant followers. Nevertheless, James was the first U.S. writer and one of just a few who understood clearly and fully that Darwin's work is fundamentally disabling to determinists and dogmatists of all sorts, religious, critical, and scientific. James realized that Darwin's theory, with its emphasis on change without direction, provided a way of understanding our universe and our social world in all of their multiplicity and unpredictability. With such a perspective on uncertainty, both thinkers became fascinated with what is so familiar but also so hard to capture or study—the emotions, the bodily responses that prepare the organism to deal rapidly with surprise and with change. A comparative look at their theories of emotion is a reminder of Darwin's enormous impact on James, the study of emotion, and the eventual development of pragmatism in America. It is also a reminder that even early in the reception of Darwin in the United States at least one of his followers understood well how Darwin's work was not the basis for a biological determinism but rather a naturalistic way of coming to terms with uncertainty.

NOTES

1. Peter J. Bowler's phrase acknowledges the scant influence the theory of natural selection had on science before the modern synthesis of genetics and evolutionary theory in the 1930s and 1940s. See Pete Bowler, *The Non-Darwinian Revolution: Reinterpreting a Historical Myth* (Baltimore, Md.: Johns Hopkins University Press, 1992).

2. On the reception of Darwin in the United States, see Bert Bender, "Darwin, Science, and Narrative," in *A Companion to American Fiction, 1865–1914*, ed. Robert Paul Lamb and Gary Richard Thompson (Malden, Mass.: Blackwell, 2005), 377–94; Peter J. Bowler, *Evolution: The History of an Idea*, 3rd ed. (Berkeley: University of California Press, 2003); Edward Caudill, *Darwinism in the Press: The Evolution of an Idea* (New York: Routledge, 2009); Carl N. Degler, *In Search of Human Nature: The Decline and Revival of Darwinism in American Social Thought* (New York: Oxford University Press, 1991); Richard Hofstadter, *Social Darwinism in American Thought*, rev. ed. (Boston: Beacon, 1955); and Ronald L. Numbers, *Darwinism Comes to America* (Cambridge, Mass.: Harvard University Press, 1998).

3. Robert D. Richardson, *William James: In the Maelstrom of American Modernism* (Boston: Houghton Mifflin, 2006), 48–49.

4. [William James], Review of "The Origin of Human Races and the Antiquity of Man Deduced from the Theory of 'Natural Selection,'" by Alfred R. Wallace, *North American Review* (July 1865): 263. Among James's earliest publications are two reviews of Darwin and reviews of texts by Thomas Huxley (Darwin's most outspoken advocate in Great Britain), Alfred Russel Wallace (who had co-discovered the principle of natural selection by arriving at the idea separately from Darwin), and Armand de Quatrefages (whose anthropological work James examines within the context of controversies surrounding the application

of Darwin's theories to the study of humans). See William James, *Essays, Comments, and Reviews*, ed. Frederick H. Burkhardt et al. (Cambridge, Mass.: Harvard University Press, 1987), 197–208, 216–21, 229–39.

5. See Louis Agassiz, "Evolution and Permanence of Type," *Atlantic Monthly* (Jan. 1874): 92–101.

6. William James to Henry James, Mar. 9, 1868, in Ralph Barton Perry, *The Thought and Character of William James*, new ed. (Nashville: Vanderbilt University Press, 1996), 102, emphasis in original. For more on the relationship between James and Agassiz, see Louis Menand, *The Metaphysical Club* (New York: Farrar, Straus and Giroux, 2001), 97–148; and Richardson, *William James*, 65–74.

7. Eugene Taylor, "William James on Darwin: An Evolutionary Theory of Consciousness," *Annals of the New York Academy of Sciences* 602 (1990): 8.

8. See Degler, *In Search of Human Nature*, 33.

9. See Bruce Kuklick, introduction to *Pragmatism*, by William James, ed. Bruce Kuklick (Indianapolis, Ind.: Hackett, 1981), xiv.

10. For more on his critique of Spencer, see William James, "Remarks on Spencer's Definition of Mind as Correspondence," in *Writings, 1878–1899*, ed. Gerald E. Myers (New York: Library of America, 1992), 893–909; and William James, "Great Men and Their Environment," ibid., 618–46. Future references to this source will be noted in the text.

11. David J. Depew and Bruce H. Weber, *Darwinism Evolving: Systems Dynamics and the Genealogy of Natural Selection* (Cambridge, Mass.: MIT Press, 1995), 182; Jonathan Hodge and Gregory Radick, introduction to *The Cambridge Companion to Darwin*, ed. Jonathan Hodge and Gregory Radick (Cambridge: Cambridge University Press, 2003), 9. See also John Dewey, "The Influence of Darwin on Philosophy," in *Darwin: A Norton Critical Edition*, 3rd ed., ed. Philip Appleman (New York: Norton, 2001), 483–89.

12. In an interesting article that provides a historical overview of the reception and use of James's theory of emotion from the nineteenth century to the present, Joseph T. Palencik does mention the significance of Darwin's theory of emotion to James. See Palencik, "William James and the Psychology of Emotion: From 1884 to the Present," *Transactions of the Charles S. Peirce Society* 43 (2007): 773.

13. Bender, "Darwin, Science, and Narrative," 383.

14. Richardson, *William James*, 141; Janet Browne, *Charles Darwin: The Power of Place* (New York: Knopf, 2002), 368.

15. Charles Darwin, *The Expression of the Emotions in Man and Animals*, 3rd ed., ed. Paul Ekman (Oxford: Oxford University Press, 1998), 360. Future references to this source will be noted in the text as *Expression*.

16. William James, *The Principles of Psychology*, ed. Frederick H. Burkhardt et al., 3 vols. (Cambridge, Mass.: Harvard University Press, 1981), 2:1074. Future references to this source will be noted in the text as *Principles*.

17. See Charles Bell, *Essays on the Anatomy of Expression in Painting* (London: Longman, Hurst, Rees, and Orme, 1806). See also William James, "What Is an Emotion?" *Mind* 9 (1884): 191; and Darwin, *Expression*, 7.

18. See Browne, *Charles Darwin*, 364; and Jonathan Smith, *Charles Darwin and Victorian Visual Culture* (Cambridge: Cambridge University Press, 2006), 179–98.

19. William James, *Talks to Teachers on Psychology and to Students on Some of Life's Ideals*, in *Writings, 1878–1899*, 826.

20. Ibid.

21. In her now-classic study of Darwin and the nineteenth-century novel, Gillian Beer sees "evolutionary theory [as] first a form of imaginative history" (8) and shows how heavily Darwin relies on narrative, analogy, and metaphor to realize his scientific ideas. See Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction* (London: ARK, 1983), esp. 3–11, 19–26, 29–48, 79–103.

22. Darwin, however, cites Shakespeare incorrectly. The verse he quotes is from scene 4, where Marcus Andronicus says: "Ah, now thou turn'st away thy face for shame! / And, notwithstanding all this loss of blood, / As from a conduit with three issuing spouts, / Yet do thy cheeks look red as Titan's face / Blushing to be encountered with a cloud."

23. James, *Psychology: Briefer Course*, in *Writings, 1878–1899*, 351. Future references to this source will be noted in the text as *Psychology*.

24. Francis Darwin, "Reminiscences of My Father's Everyday Life," in *The Life and Letters of Charles Darwin, Including an Autobiographical Chapter*, ed. Francis Darwin (New York: Appleton, 1887), 1:126.

25. William James, *Pragmatism: A New Name for Some Old Ways of Thinking*, in *Writings, 1902–1910*, ed. Bruce Kuklick (New York: Library of America, 1987), 573.

26. Ibid., 574.

27. Ibid.

28. Discussions of James's criticism of Darwin can be found in Gerald E Myers, *William James: His Life and Thought* (New Haven, Conn.: Yale University Press, 1986), 589–91n66; and Robert J. Richards, "The Personal Equation in Science: William James's Psychological and Moral Uses of Darwinian Theory," *Harvard Library Bulletin* 30 (1982): 387–426.

29. [William James], "Review of *The Variation of Animals and Plants under Domestication*, by Charles Darwin," *Atlantic Monthly* (July 1868): 124.

30. Ibid.

31. [William James], "Review of *Romantic Love and Personal Beauty*, by Henry T. Finck," *Nation* (Sept. 22, 1887): 238.

32. For a discussion of how James's overall theory of consciousness is an attempt to avoid "a priori speculations and metaphysics," on the one hand, and "brutal materialism," on the other, see Richardson, *William James*, 194–96. These two brief quotations (which Richardson uses on page 195) are from James's 1878 lecture series, "The Brain and the Mind."

33. Spencer qtd. in James, "Remarks on Spencer's Definition," 893, emphasis in original.

34. James, "Remarks on Spencer's Definition," 908, emphasis in original.

35. Ibid., 894.

36. William James, "The Dilemma of Determinism," in *Writings, 1878–1899*, 589.

37. Stephen Jay Gould, *The Structure of Evolutionary Theory* (Cambridge, Mass.: Belknap, 2002),1036.

38. Ernst Mayr, *One Long Argument: Charles Darwin and the Modern Genesis of Evolutionary Thought* (Cambridge, Mass.: Harvard University Press, 1991), 49.

39. For more on Herschel's characterization of Darwin's theory and Darwin's reaction, see Beer, *Darwin's Plots*, 9; Browne, *Charles Darwin*, 107; and Mayr, *One Long Argument*, 49.

40. See Mayr, *One Long Argument*, 48–60; and Ernst Mayr, "The Philosophical Foundations of Darwinism," *Proceedings of the American Philosophical Society* 145 (2001): 492–95.

41. In his commentary on *Expression*, Paul Ekman observes that Darwin "wanted to show that not everything can or should be explained in terms of its adaptive value" (*Expression*, 53).

42. Gould, *Structure of Evolutionary Theory*, 1225.

43. James, *Pragmatism*, 535.

44. James, "Remarks on Spencer's Definition," 905.

45. [William James], "Review of *The Ethical Import of Darwinism*, by Jacob Gould Schurman," *Nation* (Nov. 10, 1887): 376.

46. Ibid.

47. William James, "Is Life Worth Living?," in *Writings, 1878–1899*, 489; William James, *A Pluralist Universe* (New York: Longmans, Green, 1909), 321, 322. See also William James, *The Varieties of Religious Experience*, in *Writings, 1902–1910*, 1–477.

48. Ekman notes that this passage is "an especially blatant example of how completely Darwin accepted the now discredited idea of the inheritance of acquired characteristics" (*Expression*, 45). See also Browne, *Charles Darwin*, 369.

49. Charles Darwin to Joseph Hooker, Nov. 10, 1844, in "Appendix E: Letters," in Charles Darwin, *On the Origin of Species by Means of Natural Selection*, ed. Joseph Carroll (Peterborough, Ontario: Broadview, 2003), 477.

50. Beer, *Darwin's Plots*, 9.

51. A great account of this crisis and its impact on James's thinking appears in Menand, *The Metaphysical Club*, 217–20.

52. James, *Talks to Teachers*, 861.

53. For discussions of Darwin's habits and personality and their likely impact on his theorizing, see Browne, *Charles Darwin*, esp. 4–9, 43–44, 400; and Adam S. Wilkins, "Charles Darwin: Genius or Plodder?" *Genetics* 183 (2009): 774. For a superb portrait of Darwin as "a worried man" (xix), see Adrian Desmond and James Moore, *Darwin: The Life of a Tormented Evolutionist* (New York: Norton, 1994).

54. Joseph Carroll, *Literary Darwinism: Evolution, Human Nature, and Literature* (New York: Routledge, 2004), 15–18.

55. Elizabeth Grosz, *The Nick of Time: Politics, Evolution, and the Untimely* (Durham, N.C.: Duke University Press, 2004), 91.

JEFF WALKER

"The Long Road"

John Burroughs and Charles Darwin, 1862–1921

JOHN BURROUGHS'S FINAL thoughts on Darwin (published posthumously in 1921) encapsulate his long struggle with Darwin and his ideas: "The study of Darwin's works begets such an affection for the man, for the elements of character displayed on every page, that one is slow in convincing one's self that anything is wrong with his theories. There is danger that one's critical judgment will be blinded by one's partiality for the man."[1] Burroughs (1837–1921) was impressed by Darwin's powers of observation and ability to describe those observations in prose, yet whereas there were elements of Darwin's theories about evolution that Burroughs accepted wholeheartedly, there were other elements that he could not accept no matter how hard he tried. This essay will examine the sixty-year evolution of Burroughs's thoughts on Darwin from the earliest mention in 1862 to his final essay, "A Critical Glance at Darwin."

John Burroughs was one of the most well-known and widely read nature writers at the turn of the twentieth century. As such, he was an important purveyor of scientific ideas to the general public. In addition to the conventional nature themes for which he is famous, such as landscape, flora, and fauna (especially birds), Burroughs was particularly fond of writing about geologic time and the evolution of life on earth. Burroughs's literary heritage is complex. Early in his writing career he was influenced by Ralph Waldo Emerson, and from Emerson adopted an idealistic viewpoint, which he later suggested came from the German idealism of Kant and Goethe. The influence of Emerson is important in the context of Burroughs and Darwinism because Emerson was very interested in the idea of evolution, especially as presented in Chambers's *Vestiges of the Natural History of Creation* (see below), which Emerson read in 1844.[2]

Another important influence on Burroughs's understanding of science was Lyell's *Principles of Geology* (1830), arguably the first textbook in geology. Lyell

popularized the idea of uniformitarianism, which held that processes observed on earth today have been uniform in kind and degree over the course of geologic time. Natural processes are often imperceptibly slow, occurring over long periods of time, on the order of millions or even billions of years, and they have created the world as we see it now. The slow workings of nature according to uniformitarian principles fascinated Burroughs (as they did Darwin), who wrote about this often.

Other important scientific influences for Burroughs included Charles Darwin himself, whom Burroughs admired as a naturalist and scientific investigator, and scientists with whom he was acquainted, such as H. Fairfield Osborn and William Healey Dall, a leading figure in the American neo-Lamarckian movement, with whom Burroughs traveled to Alaska on the Harriman expedition in 1899.[3] In addition, Burroughs was an avid reader of magazines and newspapers—most notably *Popular Science*—from which he took material for his essays.[4]

DEBATES ABOUT EVOLUTION

To begin to understand Burroughs's intellectual trajectory, we need to know something about Darwin and his "dangerous idea," especially in the late nineteenth century and early twentieth.[5] Charles Darwin did not invent the concept of evolution. Ideas about changes in organisms over time can be traced from Aristotle through Leonardo da Vinci to the great eighteenth- and nineteenth-century naturalists, including Carl Linnaeus, Erasmus Darwin, Jean-Baptiste Lamarck, and Georges Cuvier. And though it was crucial to his hypothesis, it was also not Darwin's idea that geologic time was much longer than what could be calculated by counting generations in the Bible (the standard measure of ancient time in Western Europe). That was the work of geologists of the eighteenth and nineteenth centuries, such as James Hutton (1795), William Smith (1815), and Charles Lyell (1830). In fact, ideas about evolution and geologic time "co-evolved," so to speak, as naturalists such as Cuvier and geologists such as Smith recognized changes in fossil remains found in rock sequences that seemed to have formed over very long periods of time. Geologists and paleontologists refer to the increasing complexity of living organisms over the course of geologic time as the principle of biological succession.

Evolution was also apparently supported by the observation that the development of an embryo (known as its "ontogeny") progressed through forms that seemed to correlate with stages of increasing complexity in the development of the species (known as its "phylogeny"). The theory of recapitulation, as it was known, was neatly described by Haeckel (1876) in the phrase "ontogeny recapitulates phylogeny," but the concept had been used earlier by Robert Chambers (1844) in support of his ideas, suggesting that it was a relatively well-known phenomenon at the time.[6]

By the middle of the nineteenth century, many people, including religious

leaders, had accepted the idea that life had changed over the course of geologic time. The major debates about evolution concentrated on two important questions: Was evolution directed (and by whom)? And by what mechanism(s) did it progress? The two questions are clearly linked, and many of the alternatives dealt with both questions at least implicitly. Into these debates Darwin interjected his proposal that tiny variations occurring in individual organisms were "tested" by the environment.[7] An advantageous variation allowed an organism to survive and pass those traits to the next generation; a variation that did not give an advantage was "selected" against because the organism died younger with less opportunity to breed. The process is sometimes expressed as the "struggle for existence," and through it populations change in response to their environmental conditions, resulting ultimately in distinct populations of new species. Darwin called this process "natural selection," and it was his belief that, because the occurrence of variations was random, divine intervention was not a factor; natural selection simply required many generations reproducing over geologically long periods of time (tens or even hundreds of millions of years).

Along with Darwin's theory of natural selection came several ramifications that were difficult for many people to accept. The first was that all life is descended from one, or perhaps several, primordial progenitors, implying that humans, being part of the natural system, were descended from animals. Competing theories held that there were "centers of creation" in which species were born.[8] These notions of "special creation," especially as applied to the origins of humans, proved to be tenacious. The second concept in Darwin's theory that was difficult for many people to accept was that evolution was based on random variations; there was no direction or design. Without divine guidance, the question of mechanism becomes even more important, for without a mechanism, chaos and chance "direct" the process, an idea that was anathema to many (including Burroughs).

In the late nineteenth century, after an initial provisional acceptance of Darwin's ideas by a scientific community that had explored the many positive aspects of the theory and found that it was successful at explaining many heretofore difficult phenomena in a unified way, Darwin's theory underwent what Julian Huxley termed an "eclipse" during which scientific aspects of direction and mechanism were intensely debated.[9] One important critique of Darwinism came from the British physicist William Thomson (Lord Kelvin) and was directed at evolutionary biologists and geologists alike, for Kelvin asserted that geologic time was not sufficient for evolution to have occurred. As evidence, he "proved" from simple theoretical physics that the earth could be no more than a hundred million years old, assuming that it had cooled from a molten ball of iron.[10] Even though a hundred million years sounds like a long time, the actual period of time over which the earth was cool enough for organisms to exist, let alone evolve, was far shorter, according to Kelvin. In the early twentieth century, the discovery of radioactiv-

ity settled this argument in two different ways: the rate of radioactive decay gave geologists a tool by which to estimate the age of the earth, finding that it was several billion years old (plenty of time for evolution); and measurement of the flow of heat from the earth suggested that Kelvin's initial assumption was incorrect because heat generated by radioactive decay keeps the interior of the earth warm.

The "eclipse" of Darwinism occurred, therefore, at a time when the age of the earth was uncertain, so scientists were unsure of the length of time available for evolution to occur. It was during this period that John Burroughs wrote most of his essays on Darwin.

Nineteenth-century debates on evolution are often characterized as pitting Darwinists against Lamarckians, but in his study of the eclipse of Darwinism, Bowler divides theoretical alternatives to natural selection into four main categories: theistic evolution, Lamarckism, orthogenesis, and the mutation theory.[11] Each alternative accepted that organisms had changed over time; their goals were to provide a mechanism of that variation and to identify the forces that propelled the changes. Elements of each of these alternatives, especially as encapsulated in the so-called American school of neo-Lamarckism, can be found in Burroughs's writings on evolution.

Theistic evolution held that evolutionary variations were not random but directed "toward purposeful ends" by a divine being.[12] An early work of theistic evolution that attempted to reconcile evolution with theology and to settle the question of design or direction was Robert Chambers's *Vestiges of the Natural History of Creation* (published anonymously in 1844), which proposed a divinely preordained "plan of development that gradually pushed life up the scale of organic complexity toward man."[13] Although this scheme was eventually rejected by scientists and religious leaders alike, elements of Chambers's ideas are found in several of the alternative theories of evolution proposed in the late nineteenth century and early twentieth. In the United States, Emerson embraced Chambers's scheme, and probably in turn influenced both Walt Whitman and Burroughs.[14] Asa Gray was one of the earliest American supporters of Darwinian evolution, publishing the first review of *The Origin of Species* in America in 1860.[15] Yet Gray differed with Darwin in that he was also a strong believer in theistic evolution, and he anonymously published a series of articles on evolution entitled "Natural Selection Not Inconsistent with Natural Theology," which attempted to reconcile Darwin's ideas with theistic evolution.[16] By the end of the nineteenth century most scientists had abandoned theistic evolution precisely because it ascribed the source of evolutionary variation to a supernatural power, effectively removing any possibility of scientific investigation. However, the idea of a controlling impulse remained alive to some degree in orthogenesis and in Henri Bergson's *Creative Evolution*, where evolution is driven by a spiritual principle called *élan vital*.[17]

Lamarckism is the most famous alternative to natural selection. It is the older theory, first published in 1809, and generated the most thorough scientific testing of all the competing ideas.[18] Lamarckism postulated two causes for evolutionary change: (1) use inheritance; and (2) an inherent, progressive impulse within organisms to ascend the "chain of being." By the late nineteenth century most scientists had reduced Lamarckism to investigations concerning use inheritance, which referred to the potential for offspring to inherit characteristics acquired during the lifetime of the parent. In other words, if a giraffe reached for higher branches (to cite one of use inheritance's most popular formulations), its neck would grow longer, and succeeding generations will inherit that longer neck. Those who would reconcile Lamarckism with theistic evolution claimed that use inheritance was "a means chosen by a benevolent God to allow life the power to design itself."[19]

Orthogenesis proposed that evolution was directed by involuntary forces within the organism that caused change irrespective of the conditions; some changes might even lead to extinction.[20] Orthogenesis differs from theistic evolution in that the internal impulse does not have a divine origin, and the evolutionary changes are not always improvements. Carl Naegeli located this impulse in what he called the "idioplasm" and described it as an "inner developing and perfecting principle" (a phrase Burroughs later attributed to Lamarck).[21] Orthogenesis emphasized form over function, and was inspired in part by the appearance throughout geologic history of aberrant fossil forms that seem to have no survival value.

The mutation theory, popularized by Hugo de Vries and based in part on the genetics of Mendel, proposed that evolution proceeded by the sudden appearance of significantly new forms that created distinct new populations.[22] These new forms resulted in new populations distinct from the original population. Although the grand synthesis that would become neo-Darwinism in the later twentieth century combines the "triplet splendors of random mutation, natural selection, and Mendelian inheritance,"[23] mutation as envisioned by de Vries worked at a completely different scale. Whereas de Vries discussed major mutations that resulted in distinct new populations, the tiny mutations that drive evolution as we understand it today were considered insignificant.

The American school of neo-Lamarckism represented a synthesis of orthogenetic and theistic evolution with Lamarckism. American neo-Lamarckians embraced both of the major tenets of Lamarck's theory (use inheritance and movement up the chain of being) and also had a firm belief in the recapitulation of phylogeny by ontogeny.[24] The American school traced its intellectual heritage to the idealist philosophy of Louis Agassiz (a professor of zoology and geology at Harvard, 1847–73). Although Agassiz's vehement denial of evolution led to his eventual marginalization in the evolution debate, his influence, especially in terms of his strong anti-materialist philosophy, lingered. One of the most famous proponents of the American school was Edward Drinker Cope, a student of Agassiz who,

along with Alpheus Hyatt and Alpheus Packard, proposed the "law of acceleration of growth" in which evolutionary changes in organisms were at times so rapid that they left few or no intermediate forms. The resulting fossil record gives the impression that evolution progressed by leaps. In between these leaps were periods of relative evolutionary calm (during which time most of the fossils we find today were formed), and so the theory is sometimes referred to as the "law of acceleration and retardation."[25] Eldredge and Gould's theory of punctuated equilibria is a contemporary version of the law of acceleration and retardation, and an important concept in current evolutionary debates.[26]

The imperfect preservation of rock sequences means that the fossil record is notoriously full of gaps. Because of this, Cope the paleontologist concluded that evolution was linear, and the linearity convinced him that it was directed. He further believed that the direction came from a creator: "The law which has impelled matter to produce numberless ultimate types from common origins . . . [is] the will of the Creator," a notion that sounds like theistic evolution.[27] What made the American school distinctive was that Cope and his colleagues "internalized the Designer, making His power part of the creative ability of life to respond to environmental challenge through use-inheritance" while at the same time preserving "an idealist vision of development."[28]

BURROUGHS ENCOUNTERS DARWIN

"I am sure that I was an evolutionist in the abstract, or by the quality and complexion of my mind, before I read Darwin, but to become an evolutionist in the concrete . . . has not, for me, been an easy matter," John Burroughs says in the introduction to *Time and Change*.[29] Burroughs's intellectual reaction to Darwin was complex and changed over the course of his career. He initially embraced Darwin's ideas before he had even read his books. After reading Darwin, Burroughs became more enthusiastic about his theories despite the fact that certain aspects were difficult for him to accept. In the end, however, Burroughs was firm in his belief that evolution was directed, and he could not accept the world of randomness that the theory of natural selection envisioned.

"Analogy" (1862)

It is difficult to say when John Burroughs first became aware of the work of Charles Darwin. In 1862 he wrote, "All grades of animal life are closely related, and the common factor in each is large. Species stand to each other as antecedent and consequent; one is the condition of the other. There could be no man till first there was the zoöphyte. Darwin's hypothesis of the derivation of species is in keeping with the unity we everywhere discern."[30] Burroughs's acceptance of evolution and the derivation of different species from one another, as well as the notion that

humans are part of the natural world in every way, are all evident in this quotation. So too is his attraction to theories that bring unity to explanations of natural systems, an attraction that reflects the intellectual heritage of Emerson. It is not clear, however, on what information Burroughs based this opinion, for by his own admission, he did not read Darwin until much later. The summer he wrote "Analogy" he was living on his family's farm in the Catskills helping with farm chores.[31] He had not done much traveling, had not visited many large libraries, and had not made acquaintances in either literary or scientific circles.

Several lines of evidence suggest that Burroughs may have derived these ideas from Asa Gray's anonymously published series in the *Atlantic Monthly*, "Natural Selection Not Inconsistent with Natural Theology," even though he does not acknowledge it.[32] In that series, Gray discusses how Darwin makes use of analogy to extend the influence of evolution to "all organic beings that have ever lived on this earth," which is exactly the context in which Burroughs refers to Darwin in "Analogy."[33] Even more significant, several ideas that later become very important to Burroughs feature prominently in Gray's essay. These include the similarity of Darwin's theory to the nebular hypothesis for the origin of the solar systems, the immutability of physical laws, and the role of chance in evolution. To illustrate this last concept, Gray uses the analogy of gravity as a driving force behind the flow of water, an analogy that Burroughs will also use in later writings: "Streams flowing over a sloping plain by gravitation (here the counterpart of natural selection) may have worn their actual channels as they flowed; yet their particular courses may have been assigned; and where we see them forming definite and useful lines of irrigation after a manner unaccountable in the laws of gravitation and dynamics, we should believe that the distribution was designed."[34]

"A Salt Breeze" (1883)

It was more than two decades before Burroughs mentioned Charles Darwin again. In 1880 he finished reading *The Voyage of the Beagle* of which he later wrote that it was the work that would outlast all of Darwin's other writings.[35] Burroughs finished *The Descent of Man* on August 6, 1883, and wrote famously in his journal: "the book convinces like Nature herself. I have no more doubt of its main conclusions than I have of my own existence."[36] For the rest of that year (at least), Burroughs's journal is punctuated with commentary on Darwin and the ramifications of his theories in an attempt to reconcile Darwin with traditional views of creation. Burroughs repeatedly finds that the elegance of Darwin's theory is far preferable to the "unartistic" view of the churches. In these entries Burroughs also opines that humans are the apex of creation, and can improve nature by "manifesting consciousness and beneficence," a recurrent theme throughout the rest of his career.[37]

In late September 1883, while staying at Ocean Grove, New Jersey, Burroughs

finished *The Origin of Species* (1859) and called it "a true wonder book."[38] Echoing some of the sentiments he had expressed in 1862, Burroughs embraced the theory presented and praised Darwin as a naturalist: "His theory has such range, accounts for such a multitude of facts, easily underruns and outruns the views of we other naturalists. . . . His theory confronts and even demands the incalculable geologic ages. It is as ample as the earth and as deep as time. It mates with and matches and is as grand as the nebular hypothesis and is on the same line of creative energy."[39] Again, the elegance of a unifying theory, this time compared with the nebular hypothesis, appeals to Burroughs.

Burroughs was encouraged in his enthusiasm for Darwin by Walt Whitman, who had long accepted the concept of evolution. Whitman visited Burroughs while he was staying at Ocean Grove, and much of their conversation seems to have revolved around Darwin and evolution. In the essay "A Salt Breeze" Burroughs describes his stay at the shore, and through numerous quotations and references, he suggests that Whitman's presence influenced his thinking about Darwin.[40]

Even before the publication of *The Origin of Species*, Walt Whitman embraced the idea of evolution. Although Tanner suggests that it is not clear whether Whitman was Darwinian or Lamarckian in his opinions, Whitman had a basic sympathy for Darwin and for the struggle of existence that was fundamental to natural selection.[41] Horace Traubel reports that, late in his life, Whitman remarked, "I don't know anything that has gone higher than Darwin—the noble, the exalting. Darwin to me is science incarnate; its spirit is Darwin, Darwin its."[42] Joseph Beaver's *Walt Whitman: Poet of Science* devotes a whole chapter to this aspect of Whitman's poetry ("The Ascent of Man"), and finds that Whitman embraced the primordial origin of life and the animal origin of humans: "[I] am stucco'd with quadrupeds and birds all over, / And have distanced what is behind me for good reasons."[43] Whitman even allows that humans, though perhaps the apex of evolution currently, are not necessarily the end products of evolution: "The change thence to the sight here, and to the subtle air breathed by beings like us who walk this sphere, / The change onward from ours to that of beings who walk other spheres."[44]

The influence of Whitman on John Burroughs is well documented, so it is reasonable to assume that the time they spent at Ocean Grove in September 1883 must have helped formulate Burroughs's opinions on the topics of their conversations, which at this time probably included Darwin.[45] "A Salt Breeze" hardly mentions Whitman by name, but his presence is felt in nearly every passage. That Whitman's company was important to Burroughs's frame of mind is clear from journal entries the day after Whitman's arrival. Burroughs writes, "Walt Whitman came yesterday and his presence and companionship act like a cordial upon me that nearly turns my head. The great bard on my right-hand and the sea upon my

left—the thoughts of the one equally grand with the suggestions and elemental heave of the other."[46]

In other ways too Burroughs suggests Whitman's influence on his own thoughts about evolution. For example, Burroughs uses the phrase "cradle endlessly rocking" when referring to the sea in two different contexts. In his journal he writes, "At Ocean Grove again since last Sunday by the 'cradle endlessly rocking.'"[47] In the opening section of "A Salt Breeze," in a discussion of the influence of movements of the earth's crust on the motion of the sea, Burroughs writes: "Thus 'the cradle endlessly rocking' of which our poet sings is not only bestrode with winds and swung by the punctual hands of the tides, but the fairest summer weather gives it a nudge, and the bending of the floor beneath it contributes an impulse."[48] This phrase is a reference to Whitman's "Out of the Cradle Endlessly Rocking" (1859, the same year as *Origin of Species*), and the fact that Burroughs uses it twice implies that it is suggestive of evolution for Burroughs. Indeed, he says in the next breath, "Darwin seems to think [the sea] is the cradle where the primordial life of the globe has its infancy" (*SS*, 161).

John Burroughs's fascination with the sea and its potentialities goes even deeper, I think, since the entire opening section of the essay is suffused with the vocabulary of evolution and geologic time. It begins:

> When one first catches the smell of the sea, his lungs seem voluntarily to expand, the same as they do when he steps into the open air after long confinement indoors. On the beach he is simply emerging into a larger and more primitive out of doors. There before him is aboriginal space and the breath of it thrills and dilates his body. He stands at the open door of the continent and eagerly drinks the large air. This breeze savors of the original element; it is a breath out of the morning of the world—bitter, but so fresh and tonic! (*SS*, 159)

The section ends: "Whether or not [the sea] rocked man, or the germ of man, into being, there can be little doubt that it will continue to rock after he and all things else are wrapped in the final sleep" (161).

Throughout the essay Burroughs sprinkles remarks alluding to evolution:

> the sea, whose law is mutation, changes not (163)

> This is part of the vague fascination of the shore; 't is the boundary of two worlds. With your feet upon the present, you confront the aboriginal time and space. (163)

> the veritable ocean brine there before one, the continental, primordial, original liquid, the hoary, eternal sea itself. (165)

Finally, in the concluding section of the essay, Burroughs discusses poetry about the sea and finds, to no one's surprise, that only Whitman has the requisite "sea salt" to write good sea poetry. He emphasizes this with quotations from Whitman

that contain several evolutionary references. For instance, from *Song of Myself* he quotes the lines: "Sea of stretched groundswells, / Sea breathing broad and convulsive breaths, / Sea of the brine of life, and of unshovell'd yet always ready graves" (*SS*, 171). And the concluding lines of "With Husky-Haughty Lips, O Sea" (written by Whitman during this time on the beach at Ocean Grove and quoted in "A Salt Breeze" in its entirety) are also suggestive of evolution: "The first and last confession of the globe, / Outsurging, muttering from thy soul's abysms, / The tale of cosmic elemental passion, / Thou tellest to a kindred soul" (172). In John Burroughs's eyes, then, Walt Whitman was identified with the sea and with evolutionary ideas embodied in the sea. As Burroughs writes in a letter from Ocean Grove to his friend Myron Benton, Whitman's poetry was filled with the "grand drama of evolution."[49] It is in this frame of mind that Burroughs finished reading *On the Origin of Species* and wrote that it was a "true wonder book."

By the end of 1883 Burroughs apparently was a convert to Darwinism, and over the next few decades he became an active promoter of Darwin. In addition to essays and magazine articles, Burroughs embarked on a speaking tour in the 1890s, giving a lecture entitled "The Biological Origins of the Ruling Class," a topic with blatantly Social Darwinist implications.[50] The title was assigned to him by the organizer of the lecture tour, but the idea that successful people were endowed with special qualities that ensured their success was an important one to Burroughs.[51]

"The Long Road" (1912)

Burroughs's exposition of Darwinism peaked in 1912 when he published *Time and Change*, a collection of thirteen essays on aspects of geologic time and change, including the evolution of life. Although Burroughs says in the introduction that for him "to accept the doctrine of the animal origin of man" was a challenge, for the most part the chapters in *Time and Change* are supportive of evolution in general and "the animal origin of man" in particular.[52] Nearly all of the essays in this volume were published previously in the popular press, suggesting that they probably reached a sizable audience.

There are four articles that specifically address evolution in *Time and Change*: "The Long Road" (first published in 1909, *Atlantic Monthly*); "'The Worm Striving to Be Man'" (first published in 1910, *Independent*; the title is taken from a line in Emerson); "The Phantoms behind Us" (first published in 1912, *North American Review*; the title is taken from a line in Whitman); and "The Hazards of the Past" (first published in 1912, *Outlook*). In the introduction to the book Burroughs admits that there is a significant amount of overlap among these four essays, so I will mainly look in detail at the ideas as presented in "The Long Road."

Implying from the start that the goal of the "long road" of evolution is the development of the human species, Burroughs shows that he has gotten over his initial squeamishness about "the animal origin of man." The essay draws several

times on the "ontogeny recapitulates phylogeny" analogy: "Every unborn child at a certain stage of its development still has a tail, as it also has a coat of hair and a hand-like foot" (*TC*, 4). Agreeing with geologists and biologists who saw the ontogeny argument as indicative of the larger process of biological succession, Burroughs states that we cannot fail to see "the significance of the order in which life appears upon the globe" (18). He extends this idea further by asserting that this order of nature is, in fact, a part of our heritage in more than just a biological sense; it is the very thing that makes us human: "We know that no man is born of full stature, with his hat and boots on; we know that he grows from an infant, and we know that the infant grows from a fœtus, and, that the fœtus grows from a bit of nucleated protoplasm in the mother's womb. Why may not the race of man grow from a like simple beginning? It seems to be the order of nature; it *is* the order of nature,—first the germ, the inception, then the slow growth from the simple to the complex. It is the order of our own thoughts, our own art, our own civilization, our own language" (5, emphasis in original).

Man may be the crown of evolutionary creation for Burroughs, but he is a feeble creature after all. He cannot fly, cannot run very fast, and is weak in comparison to other animals, but even "without the specialization of the lower animals,—their wonderful adaptation to particular ends,—their tools, their weapons, their strength, their speed, man has yet made them all his servants. His brain is more than a match for all the special advantages nature has given them. The one gift of reason makes him supreme in the world" (*TC*, 27). For Burroughs, there are two ways in which human intellect makes up for physical deficiencies: through technology and through a moral sense. The future evolution of humans will not involve physical changes because there is no need: "Man is evidently the end of the series, he is the top of the biological tree. His specialization upon physical lines seems to have ended far back in geologic time; his future specialization and development is evidently to be upon mental and spiritual lines" (22). The biological tree that Burroughs mentions here is not exactly the "tree of life" as Darwin envisioned it, for it is not constantly branching (like a bush) but instead has a central trunk that leads to man: "The biological tree behaves like another tree, branches die and drop off [species become extinct], others mature and remain, while some central shoot pushes upward" (36). Burroughs firmly believes that the creation of humans was the goal of evolution, and as evolution approached that goal, it accelerated: "it finally makes rapid strides to reach man" (24). This thought, and the earlier idea that the physical specialization of humans has ended, reflect the acceleration and retardation hypothesis of Edward Drinker Cope, one of several references to Cope and the ideas of the American school of neo-Lamarckism throughout this essay.

In the end, Burroughs's conviction that humans are the apex of nature leaves him without much worry about the cause of evolution: he clearly believes that evolution must have been guided toward the creation of humans. In making this

argument he uses the analogy of gravity drawing water off the continent to the sea. In a strikingly similar argument to the one made by Asa Gray more than fifty years earlier, he says that gravity does not direct the water but acts as a constant force on its movement: "To introduce chance into the world is to introduce chaos. No more would the waters of the interiors of the continents find their way to the sea, were it not a slant in that direction, than could haphazard variation, though checked and controlled by natural selection, result in the production of the race of man" (*TC*, 38). Over time, Burroughs reacted more and more strongly to the role of chance that Darwin introduced into the world through natural selection, and in this passage, he is beginning to develop an argument on the separate roles of natural laws and chance that will be more fully developed in his later writings.

One of Burroughs's strongest connections with the American neo-Lamarckians is his long-held belief that immanence is inherent in all matter, which he articulates in "The Phantoms behind Us" thus: "creation through evolution . . . challenges our faith in the immanency and in the ceaseless activity of God in his world: it brings the creative energy down from its celestial abode and clothes it with the flesh and blood of animal life" (*TC*, 203). The creative energy referred to here is something more than simply the *élan vital* of Henri Bergson, of which Burroughs was aware before writing this essay, for it gives not only an impulse, but also a direction to evolutionary change, an idea that echoes Emerson: "Meanwhile, within man is the soul of the whole . . . to which every part and particle is equally related."[53] "The Phantoms behind Us" also raises the question of whether science is the only valid way of knowing: "There are many things that science cannot explain. Perhaps I may say that it cannot give the ultimate explanation of anything. It can do little more than tell us of the action, the interaction, and the reaction of things, but of the things themselves, their origin and ultimate nature, or the source of the laws that govern them, what does it or what can it know?" (*TC*, 220).

Questioning the interplay between chance and natural laws, and the ability of science to provide a comprehensive description of the natural world, was ultimately what mattered most to Burroughs over the next decade.

"A Critical Glance at Darwin" (1921)

By 1921, Burroughs's enthusiasm for Darwin had begun to wane, and when he mentions Darwin in his last two volumes, he refers to the naturalist and especially to his theory of natural selection with the skepticism represented in the opening quotation of this essay. The role of chance is a major point of contention, and the importance of an immanent "something" guiding evolution is paramount. "A Critical Glance at Darwin," the last essay Burroughs wrote about Darwin, opens with a spirited discussion of chance, design, and natural laws in the physical world; in this discussion Burroughs reacts strongly against a world based solely on chance variations. Chance implies unpredictability, he says, but laws are knowable and can

be used to understand natural occurrences. "If one chances to fall off his horse," Burroughs asks, "is it not [the law of] gravity that pulls him down?"[54]

Chance, for Burroughs, is better contrasted with its opposite, design, and to illustrate this distinction he uses the example of tossing a stone:

> Anything that befalls us that was not designed is a matter of chance. . . . If I carelessly toss a stone across the road, it is a matter of chance just where it will fall, but its course is not lawless. Does not gravity act upon it? does not the resistance of the air act upon it? does not the muscular force of my arm act upon it? and does not this complex of physical forces determine the precise spot where the stone will fall? If, in its fall, it were to hit a bird or a mouse, that would be a matter of chance so far as my will was concerned. (*LH*, 175)

This quotation is reminiscent of Gray's statement concerning natural laws: "It is very easy to assume that, because events in Nature are, in one sense, accidental, and the operative forces which bring them to pass are themselves blind and unintelligent (physically considered, all forces are), therefore they are undirected, or that he who describes these events as the result of such forces thereby assumes that they are undirected."[55]

For Burroughs, developing the complexity of higher animals, including the consciousness that distinguishes humans from all other animals, required guidance, which he expresses as an "innate tendency to progressive development" (similar, he says, to an "inner developing and perfecting principle," Naegeli's phrase, which he here attributes to Lamarck) that is present in every part of the universe: "I am convinced that there is something immanent in the universe, pervading every atom and molecule in it, that knows what it wants—a Cosmic Mind or Intelligence that we must take account of if we would make any headway in trying to understand the world in which we find ourselves" (*LH*, 182).

In "A Critical Glance at Darwin" Burroughs discusses at length questions of the source and utility of variation. In true American neo-Lamarckian fashion he admits to two distinct classes of variations: those characteristics acquired during the life of the organism and those that result from the "in-dwelling impulse" (*LH*, 181). Small, random variations, which we now know to be so important to evolution, are not in his view significant enough to provide a "handle" for natural selection to grab hold. Instead, Burroughs embraces the macroscopic mutations proposed by de Vries, for he believes that these changes create different species that are then refined by natural selection. "If things would only mutate a little oftener!" (196), Burroughs laments, acknowledging that there have been no cases of major mutations observed in human history.

At least two problems can be found in Burroughs's analysis, both of which caused some scientists to persist in their doubts about Darwinism well into the

twentieth century and both of which continue to create misconceptions among nonscientists today. In the first place, whereas Burroughs has shown in his other writings that he is comfortable with periods of geologic time much longer than the biblical time frame, his actual conception of time is incorrect by several orders of magnitude.[56] Burroughs speaks of the millennia (thousands of years) over which the mammals evolved, and how that time was too short for nature, working by the "hit-and-miss" method, to develop such complex organisms as humans. In reality, the Cenozoic era during which the mammals evolved spanned sixty-five million years, or sixty-five thousand millennia, ample time for significant evolutionary change in almost imperceptible increments.

Second, and in this he reflects the influence of Edward Drinker Cope and the American school of neo-Lamarckism, Burroughs is fascinated by the apparent linearity of evolution. The constant linear movement toward an ultimate goal, be it a horse or a human, suggests to Burroughs a direction to evolution that cannot be the product of chance variation and natural selection. However, as more and more fossils in many lines of descent have been discovered since Burroughs's time, it has become evident to contemporary paleontologists that for each "successful" line (that is, one that is still alive today), there are many lines that have ended (become extinct). For example, the five fossil horse species that form an apparent line of descent to the modern horse in the New World are only a few of the nearly two dozen ancestors that have been discovered, and they do not all belong to the same line of descent; most are, therefore, evidence of failed evolutionary experiments.

SOCIAL UNDERCURRENTS

John Burroughs's ideas about evolution changed over the course of his writing career, but not drastically. His major influences seem to have been Emerson, Gray, Whitman, and Cope. He enjoyed Darwin's prose and thought of him as an accomplished naturalist, but he resisted the elements of chance that natural selection introduced into the world. For Burroughs, humans were the pinnacle of nature; there would be no "better" organism to succeed human beings, and in fact evolutionary progress had reached a point of maturity so that the process was slowing down because all that needed to be done had been done. For Burroughs, however, science was not a comprehensive view of the world because although Darwin's theory of evolution provides a unified description of the natural world, it is only active in the physical realm. Burroughs believed that the world also has an aesthetic or emotional or spiritual aspect, and in this realm humans make their greatest contributions.

This tension is important because controversies regarding Darwin and natural selection have never been limited to science, but have also involved philosophy,

sociology, and religion. Bergson's *élan vital*, Herbert Spencer's laissez-faire capitalism, and Social Darwinism are among the most famous examples of competing interpretations in philosophy and the social sciences. It is in the religious realm, however, that the most persistent controversies have occurred, and John Burroughs reflected these debates in the way he attempted to reconcile Darwin with his own religious upbringing. Charles Darwin himself never could "reconcile nature's violence, its brutal competitiveness, its prolific death, with any notion of a benevolent God," and for this reason he rejected divine intervention in natural selection from the outset, even resisting the entreaties of Charles Lyell, one of his staunchest scientific supporters in England, who asked that some provision be made for the "special creation" of humans.[57]

Burroughs's reaction to Darwin's theory was influenced as much by his religious background as by Emerson or by his scientific appreciation. Although initially enthusiastic about Darwin and Darwinism, John Burroughs grew increasingly skeptical of the mechanism that Darwin had proposed, and by the time of his death in 1921 had thoroughly rejected the randomness that the theory of natural selection introduced into man's understanding of the universe. Although he claimed not to subscribe to a strict teleology involving a sentient being many people would call God, still his writings leave no doubt that nature, in determining the direction of evolution, played a god-like role in his cosmology. In this, Burroughs reflects his Baptist upbringing. Although he was quite publicly not a churchgoer, Burroughs's writings, both personal and public, leave no doubt that his real complaint was with organized religions because of the way they attempted to co-opt the spiritual and use it for their own purposes. On the other hand, Burroughs constantly demonstrates in his writing an intense spirituality, evidenced by his use of biblical quotations but more forcefully by his belief in the importance of transcendence and immanence in the universe.

J. David Hoeveler explains that the American Baptists of the nineteenth century saw things historically with "an emphatic teleology. . . . [They saw] a history full of meaning and a progression marked by cosmic purpose. They would embrace evolution, and embrace it enthusiastically, to the extent that it brought an active God back into the universe and made him the vehicle of redemptive history."[58] Compare this description to the following statement by John Burroughs in which God and nature are referred to in the same breath: "Man is the crowning product of God, of Nature, because in him all that preceded, and all that exists in objective Nature is resumed. He comprehends all, and in him what was elsewhere unconscious becomes conscious; what was physical becomes moral. He is living proof that every single atom of dust is capable of vital life and divine aspiration. Without him, Nature, though living, is dead."[59] Although this quotation is from Burroughs's first book, the issues he mentions, including the orthogenetic notion that "every single atom of dust is capable of vital life and divine aspiration" and

his conviction that humans add significance to nature, return again and again throughout his career.

Burroughs felt that to understand the world thoroughly, one needed not only an appreciation of science, but also an appreciation for the role of human emotions in understanding a world bounded by science and described by philosophy. In this, Burroughs reflects no influence as strongly as that of Walt Whitman. In *Whitman: A Study*, Burroughs writes: "In all cases Whitman's vision is as large as that of science, but it is always the vision of a man and not of a philosopher. His report of the facts has an imaginative lift and a spiritual significance which the man of science cannot give them."[60] Like Burroughs, Whitman accepted Darwin as a great scientist and theorist, but he was emphatic that the insights of science were limited and needed to be unified with metaphysics through poetry. He wrote: "Unspeakably precious as [the tenets of the evolutionists] are to biology, and henceforth indispensable to the right aim and estimate in study, they neither comprise or explain everything—and the last word or whisper still remains to be breathed, after the utmost of those claims, floating high and forever above them all, and above metaphysics."[61] For John Burroughs, the need for good poetry may not have been paramount but, with Whitman, he felt that it was important for humans to retain a healthy respect for that which we cannot see or understand. He expressed this feeling in his final critique of Darwin: "He who sees nothing transcendent and mysterious in the universe does not see deeply; he lacks the vision without which the people perish" (*LH*, 181).

NOTES

Parts of this essay appeared in substantially different form in "Burroughs, Whitman, and Darwin in the Summer of 1883 at Ocean Grove, NJ," in *Walt Whitman and John Burroughs: Literary Comrades*, ed. Ronald D. Patkus (Poughkeepsie, N.Y.: Vassar College Libraries, 2008), 21–30.

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2. See R. L. Haig, "Emerson and the 'Electric Word' of John Hunter," *New England Quarterly* 28, no. 3 (Sept. 1955): 394–97, and J. W. Beach, "Emerson and Evolution," *University of Toronto Quarterly* 28 (July 1934): 494–97.

3. D. R. Lindberg and William Healey Dall, "A Neo-Lamarckian View of Molluscan Evolution," *Veliger* 41, no. 3 (1998): 227–28.

4. See, for example, Jeffrey R. Walker, "The Shaggy Barbaric Earth: Geological Writings of John Burroughs," in *Coming into Contact: New Essays in Ecocritical Theory and Practice*, ed. Annie Merrill Ingram, Ian Marshall, Daniel Philippon, and Adam Sweeting (Athens: University of Georgia Press, 2007), 251–59.

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14. Beach, "Emerson and Evolution," 488.

15. Asa Gray, "Review of Darwin's Theory on the Origin of Species by Means of Natural Selection," *American Journal of Science and Arts* 29(Mar. 1860): 153.

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21. Carl Naegeli, *A Mechanical-Physiological Theory of Organic Evolution*, trans. V. A. Clark and F. A. Waugh (Chicago: Open Court, 1898), as qtd. in Bowler, *Eclipse of Darwinism*, 149.

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31. Edward Renehan, *John Burroughs: An American Naturalist* (Hensonville, N.Y.: Black Dome, 1992), 58.

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47. Burroughs, Journal, Sept. 21, 1883 (before Whitman arrived).

48. Burroughs, *Signs and Seasons*, 161. Hereafter cited in the text as *SS*.

49. Qtd. in Renehan, *John Burroughs*, 153.

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CAROL ANELLI

Darwin and the Prairie Origins of American Entomology

Benjamin D. Walsh, Pioneer Visionary

An englishman and contemporary of Charles Darwin at Cambridge University, Benjamin Dann Walsh (1808–69) left his life as a scholar of ancient Greek language and literature and emigrated to the United States in 1838, settling in the backwoods prairie in the new state of Illinois. As one of the nation's earliest professional entomologists, Walsh can be considered an important transitional figure in the history of American science on two fronts: as a pioneer in American entomology, including the application of entomological science to pragmatic ends; and, more important for our purposes, as an early, staunch supporter of Darwin in America who incorporated powerful arguments buttressing evolutionary theory in his many entomological publications. At a time when most entomologists labored in taxonomy without pondering the utilitarian side of their science, Walsh aggressively promoted the practical application of science. Walsh also strongly supported Darwin's revolutionary theory of species origin, developing a mutually fruitful correspondence with Darwin and making original contributions to his theory. Walsh went on to earn distinction as the first state entomologist of Illinois.

Before dedicating himself solely to the study of entomology, Walsh toiled on the frontier as a self-sufficient farmer, a lumber businessman, and a city alderman. During his thirty years in the United States, Walsh witnessed controversial milestones in American history, including the violence of Bleeding Kansas, the *Dred Scott* decision, and the Civil War. He also experienced technological marvels, including the advancing network of canals and railroads that crisscrossed the ever-expanding American nation, transporting goods and people; and the installation of telegraph lines that provided rapid, long-distance communication. In spite of these momentous innovations occurring at this industrious time in U.S. history, Walsh's decision to settle "out west" in Illinois consigned him to life in an intellectually depauperate region of the nation, devoid of the universities and scientific

libraries accessible to his eastern entomological colleagues. Nothing could have been more different from the life he left in England, but perhaps nothing else could have better prepared him to influence American science than this quintessentially pioneer experience.

Walsh's self-sufficient years as a farmer on the rough and rugged prairie of Illinois appealed to his fiercely independent spirit and sense of egalitarianism. It also brought him unremittingly face-to-face with insects, especially the intricacies of their natural histories and their pivotal roles in natural and agricultural systems. Walsh came to entomology at a critical juncture in U.S. history. As American farming and horticultural practices became increasingly mechanized, the nation began a transformation from subsistence farming to market-based agriculture. Great acreages of monocultures, such as wheat and corn, helped to meet America's rising demands, particularly during the Civil War, but such practices created a need for utilitarian entomologists to study and identify the insect pests of farm and orchard. As could be predicted by evolutionary theory, monoculture plantings facilitated the outbreaks of insect pests that evolved to feed on those plants. In response to insect ravages that devastated harvests and pocketbooks, state legislatures established appointments for entomologists to develop scientifically based control measures for insects of economic importance. Walsh and other early state entomologists emphasized the practical side of their discipline to a nation that valued utilitarianism. They saw their work as a direct route to advancing agriculture, trade, economics, and living conditions in the new nation. Walsh's studies of major crop-damaging insects were foundational to the growing field of economic entomology. Moreover, Darwinian evolution contextualized for Walsh the mechanisms underlying pest infestations: he directly connected Darwin's concepts to his own field observations, and increasingly viewed his entomological research—whether practical or philosophical—through a Darwinian lens.

Darwinian evolution provided the necessary theoretical underpinning of Walsh's entomological work. Walsh repaid the favor in his outspoken support of Darwinian theory in the American scientific scene. In particular his defense of Darwin against several of his American scientific contemporaries, such as the Harvard naturalist Louis Agassiz and the Yale geologist James D. Dana, put Walsh in the same camp as Asa Gray, the great Harvard botanist. Yet unlike Gray, who grappled with the religious implications of Darwinian evolution before adopting a form of theistic evolution, Walsh suffered from no such inhibitions: he embraced and indeed became a stalwart defender of Darwin's evolutionary theory soon after the publication of *On the Origin of Species*. As Walsh declares in a letter to Darwin, "The first perusal [of *Origin*] staggered me, the second convinced me, & the oftener I read it the more convinced I am of the general soundness of your theory."[1] Evolutionary theory bolstered the unwavering trust Walsh placed in science.

Walsh was a trailblazer—as a settler of the Illinois prairie, as a field entomolo-

gist arguing for the practicality of science, and as a naturalist philosophizing and propounding on the cogency of Darwinian theory. His background, especially the catalog of life experiences he had in common with and those that radically diverged from his contemporary countryman Charles Darwin, is essential to understanding his reaction to evolutionary theory and his influential defense of that theory in his adopted homeland. Influences similar to those that shaped Darwin's thinking and methodological approaches prepared Walsh to engage and contend with Darwin's paradigm-shifting theory. At the same time, key differences in those backgrounds—Walsh's childhood marred by family scandal and financial ruin, a university career marked by class discrimination and religious intolerance, a new life as an American pioneer and abolitionist in the years before the Civil War—profoundly influenced the arguments that he made for evolutionary theory in the U.S. context. Walsh developed a resolute belief in egalitarianism and individualism, which was an essential part of the American frontier experience for the British immigrant. Further, his belief in the fundamental equality of all people was given voice in his rejection of both special creationism and polygenic theory, which formed the backbone of both anti-evolutionary and pro-slavery arguments in the United States.

DARWIN AND WALSH: BACKGROUNDS AND INFLUENCES

Darwin and Walsh both experienced a British culture in which social class, family wealth, and ancestral pedigree mattered immensely and governed acceptable behaviors, interactions, and expectations on all levels. Five months Walsh's junior, Darwin was born to a prominent, socially respected, upper-class family of considerable means. The young Charles grew up in a loving family whose stately home sat above a bucolic setting of field and forest, where Darwin explored nature and indulged an early passion for natural history. Much has been written about his family tree, which boasts legendary free-thinking intellectuals who functioned in highly influential circles.[2]

Walsh, while ostensibly born into an advantaged social status, grew up in disgrace and penury after his father, Benjamin, lost his fortune in the lottery, embezzled from the solicitor general to make up for his losses, and tried to abscond with his ill-gotten gains on a ship bound for the United States, all while his wife, Mary, was due to deliver their sixth child. Walsh's father was expelled from the House of Commons, was imprisoned at Newgate, was tried and found guilty of a felony, and was spared being hung only owing to a legal technicality. The humiliation of these events, from which the family could never hope to recover, was undoubtedly what prompted their relocation some distance from London.[3]

Despite differences in social status and home life, Walsh and Darwin shared an educational background that exposed them to the same foundational knowl-

edge and brought them into close contact with leading intellectuals at Cambridge University. Both had attended boarding schools where they studied a classical curriculum of Latin, Greek, and ancient history that prepared boys for entrance to Cambridge.[4] After a brief stint at Edinburgh University, Darwin received his BA at Cambridge the same year as Walsh, although Walsh remained at the university much longer than Darwin did, achieving greater academic distinction.

Unlike Darwin, who declared of his boarding school experience that "nothing could have been worse for the development of my mind,"[5] Walsh reveled in his classical education. He received highly competitive awards and scholarships at his boarding school, St. Paul's, which he applied toward enrollment at Cambridge University as a sizar, that is, an impoverished student who performed menial tasks in exchange for pecuniary assistance.[6] Academically, Walsh far surpassed the majority of his university contemporaries, graduating fifth in the classical tripos at Cambridge and earning both his BA and MA.[7] He earned repute as a scholar of ancient Greek language and literature and became in 1833 a fellow of Trinity College, which rank he held until 1838. Even still, he was overlooked for a highly coveted assistant tutorship at Trinity, almost certainly because of his poor social standing. Like Darwin, Walsh intended to earn a divinity degree for a life in the ministry, until personal convictions and intellectual inclinations led him ultimately to pursue scientific interests.

In many ways, the tension between religious belief and scientific inquiry that permeated both Walsh's and Darwin's intellectual careers characterized them as men of their time. Along with thousands of others in both England and America, they enthusiastically pursued all branches of natural history, reading scientific books and journals that had increased in number and availability, and collecting and displaying beetles, butterflies, and rare specimens of all sorts.[8] Both the privileged and the less advantaged dedicated hours to "rational" amusement—visiting tidal pools, observing aquaria, collecting flowers and insects, and, when possible, studying under a microscope nature's bounty of small organisms. Thus engaged, such observers were morally uplifted and could look "through Nature up to Nature's God," an oft-uttered phrase from the Reverend William Paley, a graduate, fellow, and tutor of Christ's College at Cambridge, where Darwin resided a generation later. Knowledge of Paley and his works formed the basis for the university examination in moral philosophy, required for all baccalaureate candidates at Cambridge. Paley popularized natural theology and its "argument from design," which held that the countless, seemingly perfect adaptations found in all organisms evidenced the miraculous work of a supreme designer—the Deity.[9]

Darwin admitted to being "charmed and convinced" by Paley's "long line of argumentation," and considered his careful study of Paley's *Natural Theology* (1802), *Evidences of Christianity* (1794), and *Principles of Moral and Political Philosophy* (1785) to have been the only portion of his academic curriculum to have educated

his mind.[10] He admired natural theology texts for their informative scientific content, and yet, by the time he conceptualized his grand theory of species origin, he had displaced teleology and God from the evolutionary equation, invoking instead the mechanism of natural selection to explain the adaptations that suit organisms to their world.

In addition to Paley's works, Darwin and Walsh would have also studied extensively the third *Bridgewater Treatise*, a standard text at Cambridge written by the Reverend William Whewell, a Trinity fellow and tutor during Walsh's time. Whereas Paley's natural theology relied on biblical miracles to explain God's creation, Whewell's *Bridgewater Treatise* invoked laws established by God to explain regularities and patterns in nature.[11] For example, Whewell argued that the growth and reproductive cycles of plants were fixed by natural law to adhere to a twelve-month cycle, thereby ensuring their perfect alignment with the law that governed the yearly cycle of the earth around the sun. The emphasis on "natural law" would resonate with Darwin and Walsh, both of whom sought explanatory laws of nature independent of the will of a divine creator. Indeed, to emphasize his own reliance on natural laws for his evolutionary theory, Darwin opened *The Origin of Species* with a quote from Whewell's *Bridgewater Treatise*: "But with regard to the material world, we can at least go so far as this—we can perceive that events are brought about not by insulated interpositions of Divine power, exerted in each particular case, but by the establishment of general laws."[12]

Certainly, the search for laws that worked without divine influence also resounded with Walsh, who would come to challenge conventional thinking on issues ranging from insect infestations to American slavery. In sharp contrast to many of his contemporaries, Walsh regarded science and religion as two distinct ways of knowing. In his words, "in science we want to eliminate faith as much as possible, excellent as faith is in all religious matters."[13] He also recognized that scientists must consider all available, relevant data, and he pilloried advocates of special creation, such as Louis Agassiz, for what he saw as their propensity to overlook scientific facts that proved inconsistent with their theory: "The advocates of the Creative Theory, have, indeed, a very short and easy method of treatment in such cases as these.—'I am right and you are wrong. Whenever a fact turns up that is apparently inconsistent with my hypothesis, I am not bound to explain it, *because I am in the right*. But whenever a fact turns up that is apparently inconsistent with your hypothesis, you must explain it thoroughly and satisfactorily, under pain of being nonsuited in the Court of Science, *because you are in the wrong*.'"[14]

Walsh's critical and reform instincts were honed in the same intellectual atmosphere that led Darwin to challenge scientific truisms as he formulated the theory of evolution. Walsh clearly bristled at the limitations he encountered in Cambridge, from the requirement that only assenting members of the Anglican faith could be awarded degrees to the lack of baccalaureate examinations in the

sciences, and openly challenged established strictures. Two key mentors whom Walsh shared with Darwin—John Stevens Henslow, a professor of botany, and Adam Sedgwick, a professor of geology—were invaluable. In addition to providing scientific instruction and intellectual influence, Henslow and Sedgwick, along with John Herschel, were central figures in the university reform movement in which Walsh played a prominent role.[15] The year before he left Cambridge, Walsh published a heavily referenced reform pamphlet that ran upward of 150 pages, in which he criticized practically everything at Cambridge except the examinations.[16] In it, Walsh lobbied vigorously for the then radical inclusion of natural (life) sciences, physical sciences, modern languages, political science, history, and so on into the curriculum.[17] He argued further that recent "wonderful and interesting" scientific discoveries warranted inclusion in the curriculum, and he urged the institution toward reform: "The spirit of innovation has always been most loudly deprecated in our Universities, and there is no place where the attachment to old usages is so strong. But these are not times in which it is safe to remain far in the rear of improvement."[18]

Walsh also called for policy reforms that would promote fairness in the appointment of tutorships and roundly reproached the university for refusing to admit dissenters (non-members of the established church): "It really is a disgrace to the English Protestant Church to continue to agitate for the exaction of religious tests, when all foreign Universities at the present day, have repudiated so selfish and intolerant a system."[19] Having laid bare the archaic, often unenforceable oaths that the Cambridge cognoscenti and students were sworn to uphold (but largely did not), Walsh warned, "the present state of things cannot be allowed to continue. . . . It is no use blinking the question; there MUST be a commission appointed, sooner or later; and the University may rest assured, that the longer it is delayed, the more severe and searching will be the investigation."[20] He concluded on a poignant yet bold note: "I love the University, and I love and respect the Society, to which I am proud to say that I belong. But I do not think, that the honour either of Alma Mater, or of Domus is best promoted, by their sons pertinaciously restricting them to the use of unseemly and worn-out institutions."[21]

All the reforms that Walsh called for in his pamphlet were eventually realized at Cambridge: some not until 1851 (the year the university first offered an undergraduate examination in science), others not until the twentieth century.[22] For the purposes of this essay, the document reveals the values Walsh held at the peak of his academic career, shortly before he emigrated. It illustrates the forcefulness he deployed in fighting for his progressive views, displays his belief in egalitarianism that would surface in his anti-slavery stance in the United States, and foreshadows his intrepidness in defending Darwinian theory. Finally, it attests to Walsh's long-held belief in science and its utility, a cause he would aggressively promote as an entomologist in America.

WALSH IN AMERICA: ENTOMOLOGY, EVOLUTION, AND U.S. SCIENTIFIC DEBATES

In 1838 Walsh abandoned his twelve-year intellectual and religious life among the Cambridge intelligentsia, and his access to the 250,000 volumes in Trinity's Wren Library, for a primitive lifestyle with his wife, Rebecca Fann, on the prairie with neither an intellectual nor a library in reach.[23] Walsh states in a letter to Darwin that when he left England, he was "possessed with an absurd notion" to live a "perfectly natural life, independent of the whole world—*in meipso totus teres atque rotundus*."[24] Walsh and his wife purchased "several hundred acres of wild land in the wilderness, 20 miles from any settlement that you would call even a village, & with only a single neighbor." For twelve years the couple lived a self-sufficient existence on their farm. As Walsh describes it, the effort was grueling. He worked himself "like a horse day after day," raised "great quantities of hogs & bullocks," hooped barrels, and mended his own boots. Darwin expressed great interest in Walsh's account, exclaiming, "What an extraordinary & self-contained life you have led! & what vigour of mind you must possess to follow science with so much ardour after all that you have undergone."[25]

For a sense of historical context, imagine the Illinois that Walsh encountered in 1838. Only two decades earlier, the state had become the twenty-first to enter the Union. A huge immigration surge during the 1830s had tripled the population of Illinois to nearly half a million people. An increasing number of these immigrants came from the northeastern United States and abroad, enabled by the completion of the Erie Canal in 1825. The town of Chicago, incorporated with 350 residents in 1833, had mushroomed to nearly twelve times that number in 1838, when Chicago officially became a city. Farming was about to be revolutionized by John Deere, whose mass production of the self-scouring steel plow would allow much more rapid and effective cultivation of the rich, heavy prairie sod.

Walsh and his wife originally settled in a very remote region of Illinois. Intellectually speaking, Walsh's existence in rural Illinois stood in striking contrast to his former life at Cambridge. As Donald F. Tingley observed, anti-intellectualism was both deep-seated and commonplace on the frontier. It was the rare person who graduated college; most had little or no formal education, or only some common-school education. Most of the first seven Illinois governors did not possess a college degree. The value of education was at best doubtful among early settlers, who also feared that reading might lead to moral decay. Moreover, books were expensive and reading consumed precious time.[26]

Notwithstanding the hardships and intellectual drawbacks, Walsh delighted in the freedom from British social classism and constraints that life in America provided. In all likelihood his personality did not dispose him favorably toward genteel Victorian society, which valued personal restraint, at least outwardly. Those

who knew Walsh as a scientist noted his outspoken, often trenchant manner; the entomologist Hermann Hagen observed, "Whoever . . . showed a weak point in his logic was killed without pity."[27] Walsh not only unabashedly acknowledged this trait but seemed to consider it a point of pride. He also identified this trait at least in part with the American frontier. In a letter to William Henry Edwards, the premier lepidopterist (butterflies and moths expert) of the nineteenth century, Walsh wrote about having criticized A. S. Packard, a noted entomologist who had studied under Agassiz: "Osten Sachen thinks I have handled Packard too severely in the part already published. Perhaps I have; but his windy speculations, based upon false facts, excited my bile so severely, that I had either to let off steam or burst my liver. . . . It was strictly & entirely an act of self-defense; & we *western men* always look with a very lenient eye upon cases where a poor unfortunate man is compelled (in self-defense) to pound his neighbor."[28] Walsh often described himself as a "western" man, a label he employed when he wished to emphasize that the strictures imposed by refined American society did not bind him. In writing about a visit by Dr. Hagen and his wife to the Walsh residence, Walsh stated, "I was delighted with them both; & I believe they relish our free devil-may-care western ways better than the more stiff & formal manners of the 'modern Athens.'" Hagen, for his part, commented on Walsh's preference for informality, stating that "in his coat of unbleached linen, [Walsh] moved around the [scientific] meeting in Chicago while everyone was covered with silk and jewelry and he was very at ease, as though at home."[29]

At some point in his dozen years on his farm, Walsh apparently contracted either malaria or cholera and was brought "almost to death's door," causing him and his wife to move, around 1850, to the city of Rock Island, Illinois, where he would witness a rapid succession of pivotal events in American history.[30] Advantageously located on the Mississippi River, Rock Island bustled with activity at the nexus of twelve hundred miles of navigable waterways. During the 1850s, myriad steamboats conveyed passengers, livestock, and cargo, and in 1856 the first railroad bridging the Mississippi opened in Rock Island, ushering in an era of transcontinental commerce.[31] Walsh started a lumber business, and served briefly as an alderman, in which role he investigated allegations of corruption against the municipal government, which brought threats against his life. He also became involved in the abolitionist movement after passage of the Kansas-Nebraska Act in 1854, which incorporated popular sovereignty.

Popular sovereignty meant that settlers, not the federal government, would determine by vote the future of slavery in the territories. This aspect of the Kansas-Nebraska Act nullified the Missouri Compromise and led to violent conflicts between pro- and anti-slavery factions over whether Kansas would enter the Union as a free or slave state, events that became known as Bleeding Kansas. In 1856, Walsh traveled to Chicago to confer with two preeminent abolitionists: Colonel

James H. Lane, later a U.S. senator and Union general; and William Penn Clarke, an Iowa City Quaker and lawyer who, with John Brown, aided fugitive slaves on the Underground Railroad.[32] At the time, Walsh was a founding member and the secretary of the Rock Island County Branch of the Kansas Settlers' Society of Chicago, which provided funds and assistance for the transport of anti-slavery settlers to the Territory of Kansas.[33] Similar societies had sprung up in other northern states. While, in Walsh's view, the northern states had no more right to abolish slavery in the southern states "than we have to interfere with slavery in Cuba or Brazil," he echoed Darwin's thoughts on slavery, abhorring it as "a great military, moral and political evil." He declared, "It is true that it will be said that I might keep still, and allow others to urge the Kansas movement forward. But I have the vanity to think that I am about as well qualified as most men to direct this movement; and *thinking* so, I do not hesitate to *say* so. Where the holy cause of Free Kansas is concerned, I fling to the winds all considerations of mere personal decorum."[34] Walsh's further actions in this regard are unknown, but his admonishment of slavery remains consistent with his fierce egalitarianism and with views he expressed as a Trinity fellow two decades earlier.[35] It is not a stretch to imagine that his life in England as a second-class citizen could have added a personal dimension to his hatred of oppression and propelled him toward an enthusiastic embrace of the ideals that the United States ostensibly represented: egalitarianism and freedom for all.

As history was being made with the Supreme Court's infamous *Dred Scott* decision, an event fiercely argued in the 1858 Lincoln-Douglas debates in Illinois and across the nation, Walsh was taking steps to devote himself in a labor of love to entomological study, although he would incur significant monetary losses due to the Civil War.[36] As will be discussed in greater detail below, Walsh was one of the first in the United States to apply evolutionary theory to understanding variation and speciation in insects, including crop-damaging pests. In doing so, he found a place to make a lasting impact on American theoretical and applied scientific landscapes. Owing to the efforts of early professionals like Walsh, American entomology rose rapidly to international prominence. The Morrill Act of 1862 authorized the creation of land grant institutions that would employ entomologists as teachers and researchers, and by 1870 the United States exceeded England in funds expended on salaried agricultural entomologists.[37] Most important for the purposes of this essay, Walsh's stature as an evolutionary-minded author of scholarly publications and as a valued correspondent of eminent scientists, including Darwin, gave him the standing he needed to take on such powerful figures as Agassiz and Dana in the debate over evolution in the United States.

The scientific scene that Walsh encountered in America had taken shape within several contexts, notably patriotism, nationhood, and utilitarianism, as Americans were determined to prove that the nation's institutions promoted intellectual

achievements on a par with those of Europe.[38] Yet in the mid-nineteenth century, American science lagged behind European science. Networking with fellow entomologists through private correspondence, in a manner reminiscent of Darwin's modus operandi with fellow naturalists, proved critical for Walsh's work. So, too, did meetings of scientific societies and interactions with entomologists at state fairs, as these represented opportunities to discuss and exchange specimens with other experts.[39] Walsh often requested information from leading entomologists, particularly those in the eastern United States, who had access to books and journals in universities and academies of science. Through private and government-funded expeditions, some mounted in pursuit of territorial expansion, American entomologists had access to immense numbers of unidentified, unnamed insect species. But this advantage was poorly realized, as American insect collections were in the hands of a few individuals, in contrast to Europe, where great institutions housed and curated vast insect collections. American libraries, museums, entomological societies, and scholarly publications were similarly deficient, as were the number of individuals—about a dozen—who were actively publishing on insects in the 1840s. In the 1850s this number rose to about thirty.[40] When in the 1860s Darwin suggested that Walsh read a paper by the naturalist Henry Walter Bates, Walsh had to request Darwin's assistance: "I have no possible chance out in this uncivilized region to get a sight of Bates's Paper on mimetic Lepidoptera; when you see him, I wish you would tell him from me that I should be much obliged by anything from his pen."[41]

In *The Origin of Species*, Darwin had requested of naturalists who accepted his theory that they state publicly their convictions, writing: "Whoever is led to believe that species are mutable will do good service by conscientiously expressing his conviction; for only thus can the load of prejudice by which this subject is overwhelmed be removed" (*Origin*, 482). To show that he had done so, Walsh opened a correspondence with Darwin by enclosing five of his own publications, in four of which he had cited Darwin's theory. The two men corresponded from 1864 until Walsh's death in November 1869, enjoying a mutually beneficial exchange of ideas and information. With his letters, Walsh sent Darwin many of his publications, which Darwin cited in three of his books: *Origin*, *Variation of Animals and Plants under Domestication*, and *Descent of Man*. For the last-named work, per Darwin's request, Walsh had provided information on sexual selection in insects. Walsh felt richly rewarded, writing in 1866, "My Darwinism has opened up to me a correspondence with him, which I find both pleasant & profitable. [Some of his letters] supply information which I could not reach anywhere else."[42] The correspondence is composed of approximately thirty-five largely substantive letters, evenly distributed between the two men, of which more than thirty are extant.

The health of this correspondence was apparently fostered by Darwin's and Walsh's mutual interest in embracing conjecture and chance as important elements of sound scientific method and Darwinian theory, respectively. Darwin

famously remarked that having arrived at the near certainty that species were not immutable was like "confessing a murder." To render his theory as ironclad as possible he strove to adhere to the most stringent philosophical principles established for executing "good science," employing the iterative approach now termed the "hypothetico-deductive method" and probability theory to present his evidence for evolution in *Origin*.[43] Nevertheless, many in the scientific establishment questioned Darwin's methods. By contrast, neither Darwin's methodology nor his probabilistic reasoning raised difficulties for Walsh. Indeed Walsh placed stock in probabilistic arguments, which privilege chance and contingency rather than fixity, a method of reasoning that while threatening to many in the American scene held emancipatory potential for others. In an ongoing debate with the entomologist Cyrus Thomas, Walsh referred to "that most beautiful department of the Higher Algebra, known as the *theory of chances*," to argue from data that the chance of Thomas being correct was "several millions to one" against him.[44] Years later while researching insect-induced galls, Walsh noted a preponderant number of galls in oak (*Quercus*) versus other plant genera. Using probabilistic reasoning, he concluded that his findings supported Darwinian ("Derivative") theory to the exclusion of the alternative view offered by creationists ("Creative Theory"). "Now look at these statistics," Walsh wrote, "to see if they will teach us anything. . . . Why should 96 galls be distributed so unequally among 47 genera of the same group of plants, that 33 out of the 47, or more than two-thirds of the whole number, have none at all, and a single genus, Quercus, monopolizes more than one-half of the whole number?" He also invoked evolutionary associations for certain insect-plant interactions: "Why, as a general rule, is each gall-making genus of true insects . . . restricted to a single genus of plants? . . . On the Creative Theory, all this is an inexplicable mystery. On the Derivative Theory, we see at once why it should be so." As Walsh explained, the patterns he observed would be what one would hypothesize, a priori, "if our modern species were genetically derived from pre-existing species, [with] several new species being generated from one old one, and whole groups from time to time becoming extinct."[45]

Armed with a philosophical grounding in science from his Cambridge days, curious about the natural world, and religiously detached, Walsh was prepared to formulate an evidence-based opinion of Darwin's great theory. In seeking explanations for patterns he observed in nature, Walsh traced the methodological path established by Darwin in *Origin*, applying evolutionary principles to his own entomological findings. From the inception of their correspondence, Darwin recognized the quality of Walsh's observations and scientific reasoning. As he wrote to Asa Gray, "I had a letter a little time ago from a good believer in change of species, viz. B. Walsh of Illinois.—There are good philosophical remarks in his papers, & for some odd cause, philosophy is rarely found in entomological works."[46] In the discussion of galls, for instance, Walsh considers the scientific process employed by

Darwin, whereby facts, derived from observable patterns in nature, lead to generalizations, laws, and inductions, all with the aim of reaching the ultimate goal—a unifying, naturalistic explanation of life itself:

> The mind naturally enquires, what is THE MEANING of these and similar phenomena? Natural History is not, as some have foolishly supposed, a mere bundle of dry facts. These, it is true, form the foundation upon which we must build, and, without such a solid and immoveable base to build on, the whole edifice will crumble to dust with the first blast that assails it. But Science, to be worthy of that high and holy name, must not be contented with mere facts. Her aim is to generalize upon those facts, when a sufficient number of them has been accumulated—to curiously pry into the laws which govern the great system of which we ourselves form but an infinitesimally small fragment—to ascend from minute details to broad and sweeping inductions—in a word, to solve the great mystery of the Creation and explain to us how, and why, and wherefore we exist.[47]

As the quotations demonstrate, Darwin's writings exerted a conceptual influence on Walsh, not only helping the entomologist to "see" changes across generations, but also shaping even the rhetorical devices he employed to describe those changes. For instance, Walsh's use of metaphor to help readers comprehend significant, complex principles parallels Darwin's. Consider Walsh's description of the intricate ecological interactions among species that influence population fluctuations: "The scheme of Nature may be compared to a vast system of vibrating springs, interlacing and pressing upon one another in every direction. You cannot lighten the pressure of a single spring without reacting upon all the others, and occasionally causing some one of them to fly upwards with a sudden jerk. And this is the actual experience of every collector of insects. Not a year elapses but several dozen insects, which in ordinary years are scarce, appear in great numbers."[48] Here, Walsh's use of the image of "vibrating springs" closely parallels Darwin's famous image of the "wedge," used in *Origin* to describe an individual organism's struggle to survive and reproduce: "Lighten any check, mitigate the destruction ever so little, and the number of the species will almost instantaneously increase to any amount. The face of Nature may be compared to a yielding surface, with ten thousand sharp wedges packed close together and driven inwards by incessant blows, sometimes one wedge being struck, and then another with greater force" (*Origin*, 67).

Walsh read and publicly endorsed *Origin* within the first year and a half of its appearance. As the historian Edward Pfeifer states, through the years of the Civil War Asa Gray and Walsh stood alone as consistent supporters of Darwin in the United States. For his part, Gray strove to demonstrate that acceptance of natural selection was not antireligious and did not necessitate the concomitant rejection of design in nature.[49] Walsh, on the other hand, was unconcerned with reconciling the truth he

saw in Darwin's theories with prevailing religious beliefs. Walsh was also the only entomologist of Darwin's generation to support his revolutionary theory of species origin.[50] An insect enthusiast himself, Darwin despairingly commented more than once that it was the younger entomologists who supported his views in *The Origin of Species*, and that older entomologists had "sneered" at him and were "enough to keep the subject [of the change of species] back for 1/2 a century!"[51]

Two significant trends emerge in Walsh's references to Darwinian theory in his publications and correspondence. First, he becomes increasingly strident in his support and defense of Darwin; second, his evolutionary views become bolder and more progressive. In 1861, his earliest published reference to *Origin*, Walsh makes no mention of natural selection, the driving force for Darwinian evolution and by far the most controversial aspect of the theory. Walsh focuses on the Malthusian principles that translate into a struggle for existence and expresses enthusiastic support for chapter 3 of the book: "The following passages are extracted from the 'Origin of Species,' by my old college acquaintance, Mr. Charles Darwin. The whole chapter in which they occur is well worth the perusal of every student of Natural History, and well illustrates the battle for life which is constantly waging all around us."[52] Walsh attempts to mitigate the knowledge gap that Darwin had noted regarding which specific checks keep which species from increasing uncontrollably (*Origin*, 66). Because his article was written for the farm press and not a scientific journal, Walsh provided information on insects that keep in check populations of the armyworm, an insect pest then devastating crops.

Walsh's treatment of this topic shows clearly an early influence of Darwinian theory on his scientific thinking regarding pest outbreaks and possible solutions. Among American entomologists at the time, Walsh alone appears to have regarded the issue of insect populations from a Darwinian perspective. Walsh writes, "I now propose to show . . . that these general principles [discussed in *Origin*] apply also in the case of the army worm."[53] He states that parasites of the armyworm have their own parasites, and that fluctuations in the relative abundance of all these different species would naturally affect armyworm populations.[54] These interspecies interactions, Walsh explains to his farming readership, account for the seemingly mysterious ebb and flow of numbers in armyworm populations in different years.

A year after his armyworm article, Walsh authored two scientific journal articles, in one of which he discounts special creation and endorses Darwinian theory to explain the constancy of colorational patterning he observed in two genera of dragonflies.[55] The reference to Darwin is brief; Walsh mounts no strong argument. The following year he again authored two scientific journal articles, in one of which he expounds at length on Darwinian theory, discussing natural selection as it applies to insects. He also discusses sexual selection, speculating on the evolutionary significance of variations in male insect reproductive organs and the nature of species and hybrids: "If the above hypothesis, viz. that species often origi-

nate from structural variations in their ♂ reproductive systems, be correct, we can gain some glimpses of light upon the extraordinary and anomalous phenomena of hybridism. We can see dimly why species of distinct families never cross; why distinct species of the same family do not commonly cross in a state of nature; why varieties generally but not always cross with facility; why species apparently closely allied should sometimes cross with difficulty or not at all, and others apparently wide apart in a natural system should sometimes cross with facility."[56] Regarding this publication, science historian Mary P. Winsor notes that, unlike Walsh, most biologists paid little attention to mechanisms of speciation and sexual selection until well into the twentieth century.[57]

The year 1864 marked a watershed for Walsh in terms of his publication of scholarly journal articles (as opposed to publications in the farm press) and his defense of Darwinian theory.[58] He was at his most scathing when defending Darwin against the creationist views of Louis Agassiz (arguably the most authoritative and formidable figure in American science during the nineteenth century) and other anti-evolutionist scientists in the eastern United States. The "westerner" Walsh acerbically labeled these non-Darwinist colleagues as "The New England School of Naturalists."[59] Walsh, like Gray, was taking on a formidable target in Agassiz. The renown of the Swiss naturalist was so great that when he accepted a Harvard professorship in 1847, he immediately put the United States on a comparable scientific footing with Europe. According to the historian Nathan Reingold, as the mainstay of opposition to evolution, "Agassiz's presence in America converted the controversy over evolution in the United States from what might have been a provincial sideshow to a major incident in one of the great intellectual controversies of the nineteenth century."[60]

Agassiz remained unrelenting and resolute in his position until the day he died of a cerebral brain hemorrhage in 1873. Indeed, even one month after his death, his essay "Evolution and Permanence of Type" appeared in the *Atlantic Monthly*, in which he stated, "Darwin's theory . . . is thus far merely conjectural. . . . he has not even made the best conjecture possible in the present state of our knowledge."[61] Agassiz rejected Darwin's claim for a common center of origin for all species, considering it the greatest impediment to understanding the geographic distribution of animals. He believed in successive, separate, special creations for all God's creatures, humans included. Agassiz's view of a multiple, "polygenic" origin for humans, which conflicted with biblical accounts, drew outcries from the clerical world and was used to buttress racist sentiments in the United States.[62]

It is well known that objections to evolutionary theory were legion; many scientists, like Agassiz, argued on religious grounds and denounced natural selection as a usurpation of the Deity. For all his years spent in anticipation of a doctor of divinity degree, Walsh harbored no religious objections to Darwinian theory. Indeed, Darwinian evolution not only provided the terms by which Walsh could

reject religious explanations for natural phenomena outright, but it also formed the backbone of his opposition to religiously minded scientists like Agassiz: "I leave the believers in the Creative Theory to account for all these [entomological] facts as they best can, or, if they prefer it, to repose calmly and blandly in the [belief] . . . that it has pleased God to make everything thus and so, and that is enough for us."[63]

Walsh thought Agassiz's views preposterous and in 1864 dedicated half of a nearly fifty-page publication to attacking them, bemoaning the "preponderant influence" that Agassiz exerted over American naturalists and entomologists, who had "either tacitly acquiesced in his theories or become devoted believers in them."[64] Specifically, the evolutionary inferences that Walsh drew from similar variations shared across related species, and from intraspecific variation—both in insects he studied and as the raw material upon which natural selection acts—enabled him to formulate a powerful counterargument to Agassiz's special creationism and polygenism.[65] As already noted, Walsh sought explanatory laws of nature free from divine influence, proposing his own principles and laws to account for species variation. For instance, in 1863 he proposed the "Law of Equable Variability," which held that "if any given character is very variable in one species of a group, it will tend to be variable in allied species; and if any given character is perfectly constant in one species of a group, it will tend to be constant in allied species."[66] Such a law, which argues for relatedness across species and communities of descent, was a crucial point against both special creationism and polygenetic theory.

In attacking Agassiz's special creationism, Walsh shows that Agassiz's theory would require "many hundred or even thousand distinct Creations within the present geological era" to account for the beetle fauna found worldwide. Walsh does this by estimating the geographic distribution and number of beetle species found in North America and extrapolating to a global scale. Walsh renders the creationist outcome absurd and emphasizes that Agassiz's views are not supported by the entomological facts. But, he adds, "If, rejecting the Creative theory, we assume the Derivative Origin of Species, how simple and intelligible become the great facts of the geographical distribution of species!"[67] Agassiz's blatant misrepresentation of Darwin's theory prompts Walsh to rebuke the famed Harvard naturalist: "It is evident, indeed, from his language, that he has approached that book with the same feelings as many men approach a toad or a spider, viz. as something scarcely worthy his notice and disgustful to every rightly constituted mind." Of Agassiz's proclaimed feeling of repugnance toward *Origin*, Walsh quips, "This may be a very good reason for not reading a book, but it is a very poor reason for attempting to refute it." He declares, "The 'Origin of Species' is a strong book, well weighed and carefully thought out, written by a strong man familiar with all the discoveries of modern science and himself the honored author of many new scientific discoveries. It is utterly impossible, even for a naturalist of such distinguished attainments as

Prof. Agassiz, to upset this new theory, like a child's house built out of cards, by the mere weight of his personal authority. Least of all will it answer to set up a man of straw, call it the Darwinian theory, and amuse himself with pulling it to pieces."[68]

Following a point-by-point disputation of Agassiz's misstatements of Darwinian theory, Walsh admonishes Agassiz for having provided "not one solitary word" about "Natural Selection, the Struggle for Existence, or any of the other great leading features of the 'Origin of Species,' in any shape, manner or form." He adds: "The whole argument is ignored as completely as if it had never been promulgated; and, as we have already seen, an old, exploded doctrine which Darwin expressly disavows on eight separate occasions, is set up as a target for the dialectic arrows of Prof. Agassiz."[69] Walsh concludes his comments with a pointed prognosis of Agassiz: "Herbert Spencer has remarked of Hugh Miller, that he 'fell short of that highest faith, which knows that all truths must harmonize, and which is therefore content trustfully to follow the evidence withersoever [*sic*] it leads.' . . . The more closely we examine the recorded opinions of Prof. Agassiz, the more inclined shall we become to believe, that there is the same radical defect in the constitution of his mind."[70]

When he received from Walsh this published critique of Agassiz, Darwin responded with unreserved appreciation: "I am delighted at the manner in which you have bearded this lion in his den. I agree most entirely with all that you have written. . . . I confess, however, I did not *fully* perceive how he had misstated my views; but I only skimmed through his 'Method of Study' & thought it a very poor Book.—I am so much accustomed to be utterly misrepresented that it hardly excites my attention. But you really have hit the nail on the head *capitally*. All the younger good naturalists, whom I know think of Agassiz as you do."[71]

Agassiz's biographer, Edward Lurie, contends that Agassiz lacked an "adequate understanding of physical anthropology or ethology" and that his brand of special creationism and "dedicated compulsion" to human polygenism rested on the "scantiest of data." Agassiz dismissed claims that his scientific pronouncements lent support for slavery, yet they were used to validate racist doctrines in the years preceding the Civil War.[72] After attending a popular lecture given by Agassiz in Rock Island, Walsh wrote to Darwin of the event: "I was astonished to find that he believes that the same identical species can be & has been created twice over in two separate localities & in two separate geological epochs. Does any other naturalist believe this absurdity?"[73]

Walsh, who had advanced anti-slavery arguments before the Civil War, held a decidedly different view of human origins. When the Yale geology professor and anti-evolutionist James Dwight Dana proposed a classification scheme in which he placed humans and gorillas in separate classes, Walsh observed, "If the hind limbs of the Gorilla are true legs & in no sense arms, & if . . . he walks erect on them very generally & never climbs trees, then the Gorilla is a clear connecting

link between Man and the true Quadrumana & [Dana's] character of 'Cephalization' becomes here as worthless as in Insecta. It is very nice for Prof. Dana to be 'in a sub-class by himself,' but I don't believe he really is."[74] As one who valued classification schemes based on apparent genetic relationships, Walsh also scoffed at Dana for classifying all the insect taxa into groups of three, a number with divine allusions:

> I protest, in the name of science, against this arithmetical monomania, which is perpetually seeking to fetter the limbs of Nature in mathematical formulae. The world has had about enough of ternary, quinary and septenary systems; but from the fatal facility with which they are generated, it does not seem likely that the breed of them will very soon run out. Nothing is easier than by subdividing some natural groups and uniting others, and by giving prominence to certain characters and keeping others in the back ground, to form an artificial system of classification based upon any assignable arithmetical number from *two* up to *ten*. And when such systems are formed, what are they worth? Absolutely nothing.[75]

In referring to this publication in a private letter to Dana, Walsh remained firm in his criticism: "I have always thought that there is such a mental resemblance in all the New England Naturalists. . . . They are all inclined to lay down sweeping generalizations from what I consider very insufficient data . . . [and] to care little for facts & much for symmetry. Very probably I am wrong here; but still I have a right to my own opinion, & having such an opinion I have a right to publish it. . . . I have spoken freely without fear of offending you, because I suppose we are both of us worshippers of Truth."[76]

Walsh similarly attacked the entomologist Samuel Scudder, Agassiz's student at Harvard and a valued colleague, for reasoning like a "New England Naturalist":

> I do not agree with you in thinking that there is nothing in common between Agassiz & Dana but their living in N.E. [New England] & disbelieving in Darwin. . . . I trace in both of them the same peculiar modes of thinking—the same giving the reins to the imagination—the same utter contempt of close & accurate reasoning or what you call "logic"—the same love of symmetry & habit of sacrificing facts to symmetry . . . —the same arithmetical monomania & torturing of Nature to fit the Procrustean bed which they have pre-determined in their minds she shall lie upon, whether or nay—& finally . . . they are both of them in love with the same wonderfully mystical number—3, III, Δ . . . It is a second edition of St. Patrick converting the wild Irish of bygone times to Trinitarianism by showing them the Shamrock. . . . You ["New England Naturalists"] are, truly & correctly speaking, a School, & I take it Agassiz is the founder of the School.[77]

Even Agassiz's scientist son, Alexander, received letters from Walsh regarding his father's views, as Walsh reported to Darwin: "*Magna est veritas et prævalebit* [truth is great and will prevail], as you by this time see with your great Theory. I told

young Agassiz, who argued against your theory because so many naturalists disbelieved it, that the wonder was, not that so many disbelieved but that in six years from the date of its promulgation so many believed; & I asked him how many naturalists believed in Cuvier's great theory six years after that was promulgated?"[78]

Behind the scenes, Walsh made repeated attempts to win over cherished entomological correspondents who had responded with negativity or ambivalence toward Darwinism. Sometimes he used facts and reasoning, other times playful jibes. In a letter to Hagen, Walsh argued: "You say there is no philosophical necessity for the existence of Darwinism, & that it is just as difficult to understand how the most simple organic being is created as how the most complex one is created. Granted. But if Darwinism is *true*, that is no reason why we should reject it. I object to asking whether any discovery will explain or not the mystery of life before we consent to accept it as true. Follow truth whitherso she leads us, & don't be afraid that one truth will contradict another, or will not decipher all the hieroglyphs of Nature."[79] In a letter to LeConte, Walsh teased: "Darwin writes me word that seven of the most distinguished German Naturalists, whom he names . . . besides others, have recently come round or are coming round to the Derivative Heresy. By & by we shall be the true, orthodox church, & then we shall serve you heretics as the Athanasians served the Arians when they got the upper hand in the primitive Christian times—i.e. roast you."[80]

Walsh's published references to Darwinian theory exhibit original thought and greater progressiveness over time. His comments on what defines a species, still debated today, foreshadowed the modern biological species concept articulated by Ernst Mayr in 1942, which holds that if populations do not hybridize actually or potentially in nature, or if when they do so their offspring are infertile, then they are valid species.[81] Writing in 1863, Walsh stated, "The only valid practical criterion of specific distinctness is the general non-existence . . . of intermediate grades in the distinctive characters, whence we may reasonably conclude that the two supposed species are distinct, i.e. that they do not now in general mix sexually together, or if geographically separated that they would not do so supposing them to be placed in juxtaposition. . . . They may even now mix sexually together in some few rare instances . . . and yet if they do not commonly and habitually mix together the species will remain distinct."[82] In *The Origin of Species*, Darwin judiciously skirted the definition of a species, a subject of ongoing debate at the time.[83] By contrast, Walsh remained firm in his definition and, not surprisingly, criticized naturalists—Darwin included—for not clarifying their own views.[84]

In anticipating what are now termed "cryptic species" (i.e., species that are morphologically indistinguishable from one another yet are reproductively isolated) and in positing a mechanism for their evolution, Walsh demonstrated extraordinary prescience. He discussed his ideas in 1864–65 in two papers originating the concept of "phytophagic speciation," whereby a new species could arise in certain

plant-feeding insects that evolve in sympatry (i.e., the same geographic area).[85] Phytophagic speciation represented an alternative mechanism to Darwin's geographic (allopatric) speciation, which requires the presence of a geographic barrier to reproduction. As envisioned by Walsh, phytophagic speciation could occur in insects that undergo a shift in preferred host plant. In these particular insects, the adult female selects the host plant species for her offspring by laying her eggs on it, and the larvae that hatch consume the leaves. Walsh hypothesized that if individuals with the propensity for the new host plant reproduced largely among themselves, then the preference for that host plant could be transmitted to their descendants after "an indefinitely long series of generations—say fifty, or a hundred, or a thousand, or ten thousand."[86] He posited a progression toward complete reproductive isolation. Initially the individuals would form a phytophagic variety, with the ability to interbreed freely with other varieties of the same insect species; gradually they would become a phytophagic race, akin to a geographic race; finally they would be unable to intercross with members of the original species, whereupon they would form a reproductively isolated, new species, although in appearance these insects might very closely resemble the ancestral species. Walsh sent his phytophagic speciation publications to Darwin, who included a discussion of the topic in the fourth and subsequent editions of *Origin*.[87] In Walsh's estimation, Darwin's citations to his work in *Origin* assured Walsh of immortality because, as he put it, "I don't think that book will ever perish."[88]

Tragically, Walsh's life was cut short following injuries he suffered from a railway accident. He exonerated the railroad engineer of all culpability in the incident.

WALSH'S LEGACY

A pioneer on the Illinois prairie, Walsh made his mark at the vanguard of entomology and evolutionary thinking in the United States. His prodigious scientific output proved foundational for taxonomic, agricultural, and evolutionary studies of insects. The first two periodicals in America devoted to applied entomology were edited or co-edited by Walsh and are filled with his writings.[89] Celebrated for his rhetorical flourishes, he frequently wielded his pen against charlatans who peddled worthless insecticides to unsuspecting farmers. Walsh's appointment as the first state entomologist of Illinois, an office nearly without precedent, predated the first professorship in American entomology. His dedication to the practical use of scientific knowledge foreshadowed the modern attitude toward the utility of science for the betterment of society.

Writing as historians, twentieth-century entomologists find evidence of Walsh's scientific approaches and emphasis on empirical evidence in the work of his protégé and co-editor, C. V. Riley, often cited as the foremost nineteenth-century entomologist. Leland Howard goes further, declaring that although it is com-

monly stated that "modern American economic entomology" arose with Riley, "after Walsh's work is carefully considered we cannot fail to acknowledge that it began with him."[90]

Walsh possessed a suite of intellectual and personal attributes, the melding of which enabled him to formulate an evidentiary-based opinion of Darwin's theory. His sharp mind and equally sharp pen served him well in defending that theory, now regarded as the unifying paradigm for biology and medicine. Today prominent researchers recognize Walsh for wrestling with the species concept and note his foresight regarding cryptic species.[91] His concept of phytophagic speciation has been credited as the theoretical progenitor of sympatric speciation, which is discussed alongside allopatric speciation in modern introductory biology textbooks.[92]

In considering Walsh's influence on U.S. scientific culture, we find him at the forefront of both applied and theoretical studies of insects. Yet his legacy extends beyond his chosen discipline with his stalwart defense of and contributions to Darwinian theory. As an immigrant who willingly withstood hardships in pursuit of personal freedom, Walsh's story is a very American one, but it cannot be told without an understanding of Darwin's powerful presence in Walsh's scientific convictions and pursuits.

NOTES

I dedicate this essay to the memory of my parents, Marion Catherine Martino Anelli (1920–2012) and Joseph Michael Anelli (1918–2012), the children of Italian immigrants to America; and to my dear mentor and colleague in the history of entomology, Edward H. Smith (1915–2012). I gratefully acknowledge permission from the various archives to quote from their holdings.

1. Benjamin Walsh to Charles Darwin, Apr. 29, 1864, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4477 (accessed June 12, 2013).

2. Biographical treatments of Darwin are numerous. See John Bowlby, *Charles Darwin: A New Life* (New York: Norton, 1990); Peter J. Bowler, *Charles Darwin: The Man and His Influence* (Oxford: Blackwell, 1990); Janet Browne, *Charles Darwin: Voyaging* (Princeton, N.J.: Princeton University Press, 1995); Janet Browne, Charles Darwin: *The Power of Place* (New York: Knopf, 2002); Adrian Desmond and James Moore, *Darwin* (London: Michael Joseph, 1991).

3. John A. Venn, *Alumni Cantabrigienses* (Cambridge: Cambridge University Press, 1954), vol. 6, pt. 2, 333. For quite valuable information on Walsh's parents and his formative years I am indebted to Mr. Guy C. Harris of Chalfont St. Peter, Buckinghamshire, England, the great, great, great grandson of Walsh's father, who is the "gentleman" referred to in the title of Harris's self-published book, *Trials and Tribulations of a Georgian Gentleman, including the Lives and Times of My Ancestors and Their Families*, 2nd ed. (n.p.: 2005).

4. Browne, *Charles Darwin*, 27.

5. Nora Barlow, ed., *The Autobiography of Charles Darwin, 1809–1882, with Original Omissions Restored* (New York: Norton Library, 1958), 27.

6. Walsh received the Governor's Prize for Latin Lyrics; the Campden Exhibition to Trinity College, Cambridge (the only one granted in 1827, worth £100); and the Perry Exhibition during his first year at Cambridge. Robert B. Gardiner, *The Admission Registers of St. Paul's School, from 1748–1876* (London: Bell and Sons, 1884), 258, 406–9, 411–14. Regarding sizars, see Denys A. Winstanley, *Early Victorian Cambridge* (Cambridge: Cambridge University Press, 1955), 415–16.

7. That is, among Cambridge honors scholars in 1831 who took the classics exam for the baccalaureate, Walsh ranked fifth academically. Joseph R. Tanner, ed., *The Historical Register of the University of Cambridge* (Cambridge: Cambridge University Press, 1917), 605.

8. David E. Allen, *The Naturalist in Britain: A Social History* (Princeton, N.J.: Princeton University Press, 1976), 70–73; Lynn Barber, *The Heyday of Natural History, 1820–1870* (Garden City, N.Y.: Doubleday, 1980), 13–14, 21–26; Browne, *Charles Darwin*, 51–52.

9. It should be noted that natural theology, an alternative to revealed theology, encompassed a variety of nuanced views. See Dov Ospovat, "God and Natural Selection: The Darwinian Idea of Design," *Journal of the History of Biology* 13, no. 2 (1980): 169–94; Antonello La Vergata, "Images of Darwin: a Historiographic Overview," in *The Darwinian Heritage*, ed. David Kohn (Princeton, N.J.: Princeton University Press, 1985), 948; Michael Ruse, *The Darwinian Revolution: Science Red in Tooth and Claw* (Chicago: University of Chicago Press, 1979), 70–73, 148–49.

10. Barlow, *Autobiography*, 59.

11. Ruse, *Darwinian Revolution*, 70–71.

12. Charles Darwin, *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life* (London: Murray, 1859), n.p.

13. Benjamin Walsh to Hermann Hagen, Sept. 11, 1868, by permission of the Ernst Mayr Library, Museum of Comparative Zoology Archives, Harvard University, Cambridge, Mass.

14. Benjamin D. Walsh, "On the Insects, Coleopterous, Hymenopterous, and Dipterous, Inhabiting the Galls of Certain Species of Willow. Part 2d and Last," *Proceedings of the Entomological Society of Philadelphia* 6 (1866): 223–88, 238 (emphases in original).

15. Peter Searby, *A History of the University of Cambridge, 1750–1870* (Cambridge: Cambridge University Press, 1997), 3:465–68.

16. Benjamin D. Walsh, *A Historical Account of the University of Cambridge, and Its Colleges*, 2nd ed. (London: James Ridgway and Sons, 1837).

17. Searby termed Walsh "the Cambridge don who must be judged the most advanced of internal reformers." Searby, *History*, 465.

18. Walsh, *Historical Account*, 105–6.

19. Ibid., 25.

20. Ibid., 154–55.

21. Ibid., 156–57.

22. Ruse, *Darwinian Revolution*, xi–xii; Searby, *History*, 471.

23. Walsh's wife's maiden name has been variously reported as Fann, Fenn, or Finn.

24. Benjamin Walsh to Charles Darwin, Nov. 7, 1864, Darwin Correspondence Data-

base, http://www.darwinproject.ac.uk/entry-4663 (accessed Sept. 5, 2012). The Latin translation, which Walsh adapted from Horace's satires, reads: "in myself a whole, smoothed and rounded."

25. Charles Darwin to Benjamin Walsh, Dec. 4, 1864, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4695 (accessed Aug. 17, 2012).

26. Donald F. Tingley, "Anti-Intellectualism on the Illinois Frontier," in *Essays in Illinois History*, ed. Donald F. Tingley (Carbondale: Southern Illinois University Press, 1968), 4, 7.

27. Hermann Hagen, "Necrolog. Benjamin D. Walsh," *Entomologische Zeitung* 31 (1870): 354–56, 356. Hagen's obituary of Walsh was kindly translated from the original German by Dr. Marina Meixner, Landesbetrieb Landwirtschaft Hessen, Bieneninstitut Kirchhain, Germany. Hagen is distinguished as the first professor of entomology in the United States, a position he held at Harvard University.

28. Benjamin Walsh to William H. Edwards, Mar. 27, 1867, William H. Edwards Collection, West Virginia State Archives and Manuscript Collections, MS 79-2, Charleston.

29. Benjamin Walsh to John LeConte, Aug. 15, 1868, John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa. Harvard University is the "modern Athens" to which Walsh facetiously refers. Hagen, "Necrolog.," 355.

30. Paul Elmen, *Wheat Flour Messiah: Eric Jansson of Bishop Hill* (Carbondale: Southern Illinois University Press, 1976), 140–44, 165–66; Carol A. Sheppard, "Benjamin Dann Walsh: Pioneer Entomologist and Proponent of Darwinian Theory," *Annual Review of Entomology* 49 (2004): 3.

31. Kathleen Seusey, *Rock Island History: A Companion to the Architectural Walking Tours* (Rock Island, Ill.: Rock Island Preservation Commission, 1999), 8–9, http://www.rigov.org/index.aspx?NID=99 (accessed Sept. 6, 2012).

32. Walsh's efforts and political views are chronicled in a three-page circular he authored, "To the Members of the Kansas Settlers' Society of [*sic*]," dated from Chicago, Ill., June 2, 1856. See Territorial Kansas Online, http://www.territorialkansasonline.org/~imlskto/cgi-bin/index.php?SCREEN=view_image&document_id=100136&file_name=h000484. "Obituary. James H. Lane, United States Senator from Kansas," *New York Times* (July 4, 1866), http://query.nytimes.com/gst/abstract.html?res=F10D1EF73D551A7493C6A9178CD85F428684F9 (accessed Sept. 7, 2012).

33. Smithsonian Institution Archives, Benjamin Dann Walsh Field Notebooks, 1860–1869, vol. 1, record unit 7123. Contains an account of the founding of the Rock Island County branch of the Kansas Settlers' Society of Chicago, June 12–15, 1856.

34. Walsh, "To the Members of the Kansas Settlers' Society," 3.

35. Edith Hall, "Introduction: 'A Valuable Lesson,'" in *Ancient Slavery and Abolition: From Hobbes to Hollywood*, ed. Edith Hall, Richard Alston, and Justine McConnell (Oxford: Oxford University Press, 2011), 25. Hall notes Walsh's anti-slavery sentiments as expressed in his publication *The Comedies of Aristophanes, Translated into Corresponding English Metres*, vol. 1 (London: Baily, 1837).

36. Benjamin Walsh to John LeConte, May 6, 1863, John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa.

37. For analysis of the American entomological community around the time of Walsh,

see W. Conner Sorensen, *Brethren of the Net: American Entomology, 1840–1880* (Tuscaloosa: University of Alabama Press, 1995).

38. Both John C. Greene, *American Science in the Age of Jefferson* (Ames: Iowa State University Press, 1984), and Daniel Walker Howe, "American Victorianism as a Culture," *American Quarterly* 27 (1975): 507–32, provide useful context.

39. For example, in a letter to John LeConte dated August 27, 1861, Walsh indicates his pending travel to Chicago to attend the Illinois State Fair. He was bringing with him his entire collection to meet with fellow entomologists, with whom he intended to share any insect identifications that LeConte could provide. In a subsequent letter to LeConte (Sept. 22, 1861), Walsh states that his having received a monetary award ($75) for the best insect collection at the fair "much vexed" LeConte's "quondam correspondent," a Dr. Helminth. Benjamin Walsh to John LeConte, both letters in the John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa.

40. Sorensen, *Brethren of the Net*, 21, 33–35.

41. Darwin was referring to the now-classic paper, Henry Walter Bates, "Contributions to an Insect Fauna of the Amazon Valley. *Lepidoptera: Heliconidæ*," *Transactions of the Linnean Society of London* 23 (1862): 495–566. Bates described the type of mimicry that now bears his name, "Batesian mimicry." Benjamin Walsh to Charles Darwin, Mar. 1, 1865, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4778 (accessed Aug. 16, 2012).

42. Benjamin Walsh to Samuel Scudder, Nov. 30, 1866, Samuel H. Scudder Correspondence, Museum of Science, Boston.

43. Darwin consulted pertinent seminal works by William Whewell and John Herschel, whose *A Preliminary Discourse on the Study of Natural Philosophy* appeared the year that Walsh and Darwin received their bachelor's degrees. Ultimately, Darwin's use of probability theory proved problematic for Herschel and Whewell, for whom the precise equations of Newtonian astronomy embodied the ideal scientific theory. I am simplifying matters here, but for Whewell and Herschel the grandest scientific laws were quantitative and explained "true causes" (*verae causae*) of natural phenomena, for example, Newton's laws of motion and gravitation. Moreover, both Whewell and Herschel found it indefensible that Darwin had not given sufficient recognition to God as the designer of organic adaptation. For a fuller discussion, see Michael Ruse, "Darwin's Debt to Philosophy: An Examination of the Influence of the Philosophical Ideas of John F. W. Herschel and William Whewell on the Development of Charles Darwin's Theory of Evolution," *Studies in the History and Philosophy of Science* 6 (1975): 159–81, esp. 180–81; Ruse, *Darwinian Revolution*, 56–63; Michael Ghiselin, *The Triumph of the Darwinian Method* (Chicago: University of Chicago Press, 1969); David L. Hull, *Darwin and His Critics: The Reception of Darwin's Theory of Evolution by the Scientific Community* (Chicago: University of Chicago Press, 1973), 12–13, 30–34; Browne, *Charles Darwin*, 512.

44. Walsh concluded in exasperation, "If [my] argument does not convince you, I must give you up as incurable. If you will not be convinced by mathematical demonstration, neither will you be convinced, though fifty Linnaeuses and Latreilles rose from the dead to din the truth into your ears." Benjamin D. Walsh, "The Army Worm Question," *Prairie Farmer*, n.s., 8, no. 24 (1861): 370–71, 371.

45. Walsh, "On the Insects, Coleopterous . . . Part 2d," 287.

46. Charles Darwin to Asa Gray, Oct. 29, 1864, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4647 (accessed Sept. 7, 2012); Sheppard, "Benjamin Dann Walsh," 11.

47. Benjamin D. Walsh, "On the Insects, Coleopterous, Hymenopterous, and Dipterous, Inhabiting the Galls of Certain Species of Willow. Part 1st—Diptera," *Proceedings of the Entomological Society of Philadelphia* 3 (1864): 543–644, 634. Walsh sent this publication to Darwin in February 1865.

48. Benjamin D. Walsh, "Insects Injurious to Vegetation in Illinois," *Transactions of the Illinois State Agricultural Society* 4 (1861): 335–72, 360. The term "ecology" was not coined until 1873, but Darwin possessed a vast knowledge of the subject and it was central to his theory. See Mark Ridley, *How to Read Darwin* (London: Granta, 2005), 19–22.

49. Edward J. Pfeifer, "United States," in *The Comparative Reception of Darwinism*, ed. Thomas F. Glick (Chicago: University of Chicago Press, 1974), 168–206, esp. 184–85; Bert J. Loewenberg, "The Reaction of American Scientists to Darwinism," *American Historical Review* 38, no. 4 (1933): 687–701, esp. 695–96; A. Hunter Dupree, *Asa Gray: American Botanist, Friend of Darwin* (Baltimore, Md.: Johns Hopkins University Press, 1959), 275–81.

50. For my corroboration of Pfeifer's findings and rationale for Walsh's staunch support of Darwinian theory, see Sheppard, "Benjamin Dann Walsh," 11.

51. Charles Darwin to Henry Bates, Nov. 22, 1860, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2993; Charles Darwin to Charles Lyell, Mar. 17, 1863, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4047 (both accessed Sept. 8, 2012). Darwin's perception of entomologists likely stems from negative reviews of *Origin* written by the entomologists John Obadiah Westwood, Thomas Vernon Wollaston, and Andrew Murray. See Sheppard, "Benjamin Dann Walsh," 11.

52. Walsh, "Insects Injurious to Vegetation," 359. This publication appeared in July 1861.

53. Walsh, "Insects Injurious to Vegetation," 360.

54. In current terminology, these "parasites" would be termed "parasitoids," distinguished from parasites because parasitoids kill their host.

55. Benjamin D. Walsh, "List of the Pseudoneuroptera of Illinois Contained in the Cabinet of the Writer, with Descriptions of over Forty New Species, and Notes on Their Structural Affinities," *Proceedings of the Academy of Natural Sciences of Philadelphia* 14 (1862): 361–402, 383.

56. Benjamin D. Walsh, "Observations on Certain N.A. Neuroptera, by H. Hagen, M.D., of Koenigsberg, Prussia; Translated from the Original French MS., and Published by Permission of the Author, with Notes and Descriptions of about Twenty New N.A. Species of Pseudoneuroptera," *Proceedings of the Entomological Society of Philadelphia* 2 (1863): 167–272, 219.

57. Mary P. Winsor, *Reading the Shape of Nature: Comparative Zoology at the Agassiz Museum* (Chicago: University of Chicago Press, 1991), 100.

58. For a year-by-year graph summarizing Walsh's publications, see Sheppard, "Benjamin Dann Walsh," 7.

59. Walsh's "New England School of Naturalists" included Agassiz, his students at Har-

vard (notably entomologists Samuel H. Scudder and Alpheus S. Packard Jr.), and geologist James D. Dana of Yale.

60. Nathan Reingold, *Science in Nineteenth Century America* (Chicago: University of Chicago Press, 1964), 181. Also see Edward Lurie, *Louis Agassiz: A Life in Science* (Chicago: University of Chicago Press, 1960), 162–65, 267. Pfeifer, "United States," discusses America's love affair with Agassiz and his influence. Also see Bert J. Loewenberg, "The Reaction of American Scientists to Darwinism," *American Historical Review* 38, no. 4 (1933): 687–701, 692.

61. Qtd. in Edward Lurie, *Nature and the American Mind: Louis Agassiz and the Culture of Science* (New York: Science History Publications, 1974), 118. Also see Lurie, *Louis Agassiz*, 383–85.

62. Lurie, *Louis Agassiz*, 259.

63. Walsh, "On the Insects, Coleopterous . . . Part 2d," 240.

64. Benjamin D. Walsh, "On Certain Entomological Speculations of the New England School of Naturalists," *Proceedings of the Entomological Society of Philadelphia* 3 (1864): 207–49, 208.

65. Sheppard, "Benjamin Dann Walsh," 12, 16–17.

66. Walsh, "Observations on Certain N.A. Neuroptera," 213. Darwin cited Walsh's "law" in later editions of *Origin*. Walsh also argued that whenever man "violates great natural laws" that upset the balance of nature, population densities of insect pests can become overwhelming. Regarding this and also his comments on the "balance of nature," see Walsh, "Insects Injurious to Vegetation," 339.

67. Walsh, "On Certain Entomological Speculations," 222. By "Derivative Origin of Species," Walsh meant Darwin's theory.

68. Ibid., 223.

69. Ibid., 226.

70. Ibid., 231.

71. Charles Darwin to Benjamin Walsh, Dec. 4, 1864, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4695 (accessed Sept. 8, 2012).

72. Lurie, *Louis Agassiz*, 255–66.

73. Benjamin Walsh to Charles Darwin, Mar. 1, 1865, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4778 (accessed Sept. 8, 2012).

74. Benjamin Walsh to John LeConte, Sept. 9, 1863, John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa. Dana's classification scheme appeared in several papers in volumes 36 and 37 (1863–64) of the *American Journal of Science*, known as *Silliman's Journal*, for which Dana served as editor. Dana maintained his special creation views until 1874, when he announced his acceptance of evolutionary theory. By this time American scientific opposition to Darwinism had abated and discussion focused on the processes of evolution. See Pfeifer, "United States," 195–96.

75. Walsh, "On Certain Entomological Speculations," 238. For his support of classification schemes based on presumed evolutionary relatedness, see Benjamin D. Walsh, "On the Genera of *Aphidae* Found in the United States," *Proceedings of the Entomological Society of Philadelphia* 1 (1862): 294–311, 306.

76. Benjamin Walsh to James Dana, Dec. 17, 1865, Dana Family Papers, Manuscripts and Archives, Yale University Library, New Haven, Conn. When Dana responded in print to Walsh's criticism (*American Journal of Science and Arts* 41 [1866]: 163–74), Walsh humorously wrote to LeConte, "I see Prof. Dana, after hanging fire for a year & a half, has at last discharged his pop-gun at me. I have a short rejoinder to him now in press." Benjamin Walsh to John LeConte, June 18, 1866, John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa. Walsh's rejoinder appeared as "Prof. Dana and His Entomological Speculations," *Proceedings of the Entomological Society of Philadelphia* 6 (1866): 116–21. Walsh sent this publication to Darwin.

77. Benjamin Walsh to Samuel Scudder, Dec. 17, 1864, Samuel H. Scudder Correspondence, Museum of Science, Boston.

78. Benjamin Walsh to Charles Darwin, Mar. 1, 1865, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4778 (accessed Sept. 8, 2012).

79. Benjamin Walsh to Hermann Hagen, Oct. 17, 1864, by permission of the Ernst Mayr Library, Museum of Comparative Zoology Archives, Harvard University, Cambridge, Mass.

80. Benjamin Walsh to John LeConte, Jan. 1, 1865, John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa.

81. Ernst Mayr, *Systematics and the Origin of Species* (New York: Columbia University Press, 1942), 120.

82. Walsh, "Observations on Certain N.A. Neuroptera," 220.

83. Darwin wrote, "Nor shall I here discuss the various definitions which have been given of the term species. No one definition has as yet satisfied all naturalists; yet every naturalist knows vaguely what he means when he speaks of a species" (*Origin*, 44). Regarding Darwin's tactic in this regard, see John Beatty, "Speaking of Species: Darwin's Strategy," in Kohn, *Darwinian Heritage*, 265–81.

84. See Sheppard, "Benjamin Dann Walsh," 19–20.

85. Benjamin D. Walsh, "On Phytophagic Varieties and Phytophagic Species," *Proceedings of the Entomological Society of Philadelphia* 3 (1864): 403–430; Walsh, "On Phytophagic Varieties and Phytophagic Species, with Remarks on the Unity of Coloration in Insects," *Proceedings of the Entomological Society of Philadelphia* 5 (1865): 194–216.

86. Walsh, "On Phytophagic Varieties and Phytophagic Species," *Proceedings* 3: 405.

87. Darwin, *Origin*, 4th ed., 55–56, http://darwin-online.org.uk/content/frameset?itemID=F385&viewtype=text&pageseq=1 (accessed Sept. 8, 2012).

88. Benjamin Walsh to John LeConte, June 18, 1866, John L. LeConte Papers, American Philosophical Society Library, Philadelphia, Pa.

89. For discussion of these two periodicals, see Carol A. Sheppard, "A Brief History of *The Practical Entomologist* and Its Contributions to Economic Entomology," *Entomological News* 100 (1989): 212–23; Edward H. Smith and Carol A. Sheppard, "A Heritage of Distinguished Journalism," *American Entomologist* 36 (1990): 7–17.

90. Leland O. Howard, "A History of Applied Entomology (Somewhat Anecdotal)," *Smithsonian Miscellaneous Collections* 84 (1930): 50.

91. Regarding Walsh's species concept, see James Mallet, "Perspectives: Poulton, Wallace and Jordan: How Discoveries in *Papilio* Butterflies Led to a New Species Concept 100 Years Ago," *Systematics and Biodiversity* 1, no. 4 (2004): 441–52, 447. Also see Stewart H. Ber-

locher, "Origins: A Brief History of Research on Speciation," in *Endless Forms*, ed. Daniel J. Howard and Stewart H. Berlocher (Oxford: Oxford University Press, 1998), 4. Regarding Walsh and cryptic species see Ernst Mayr, *The Growth of Biological Thought* (Cambridge, Mass.: Belknap, 1982), 281.

92. For pertinent comments from insect systematists, see Berlocher, "Origins," 5; and Scott R. Diehl and Guy L. Bush, "An Evolutionary and Applied Perspective of Insect Biotypes," *Annual Review of Entomology* 29 (1984): 471–501, 471.

KAREN LENTZ MADISON AND R. D. MADISON

Darwin's Year and Melville's "New Ancient of Days"

Charles darwin was ten years Herman Melville's senior. The American author's fascination with natural history permeates his greatest work, *Moby-Dick*, but also reveals itself in a lifelong interest in geology and its implications in an increasingly doubtful nineteenth century. Familiar with Darwin's writing from his twenties, Melville never escaped the attractions and repulsions of Lyellian time and Darwinian evolution.

In August 1839, the week he turned twenty, Herman Melville embarked on his first ship: the packet *St. Lawrence* bound to Liverpool. He had no idea that in less than a dozen years he would write a great American novel, and certainly no idea that on the eve of the Civil War he would turn poet. *Clarel*, his often bitter epic poem of faith and doubt, and "The New Ancient of Days," his jeu d'esprit of doubt and Darwin, lay at the distant end of a long literary career. But in retrospect we can trace the growth of Melville's geological awareness against the background of Victorian science until we arrive at his great religious poem—and his far less well-known rollicking mockery of religionists of all stripes stuck in the status quo.

Had Melville an inkling of the literary use he'd make of this voyage a decade later, he might have spent more time poking around the bookstalls of the metropolis of the Irish Sea. For 1839 saw the publication of Thomas Beale's *The Natural History of the Sperm Whale*, a work Melville would plunder a decade later in the composition of his whaling epic, *Moby-Dick*. In that year also, the London firm of Henry Colburn published an unauthorized reprint of the third volume of a four-volume travel narrative. The account he pirated was of the voyage of the *Beagle*, and the volume he published was Charles Darwin's *Journal of Researches*. When Darwin got around to publishing a revised version with competing publisher John Murray in 1845, the book had become strongly influenced by two developing as-

pects of Darwin's mind: natural selection and doubt. The next year, 1846, Harper published the two-volume, revised version in America, and it was this set that Melville purchased in April 1847 (Sealts no. 175) when he himself was turning to questions of time and truth.[1]

By 1846, Melville was on his way to becoming a best-selling author with *Typee*, a fictionalized account of life among cannibals; *Omoo* followed in 1847. In each case, Melville had supplemented his own adventures not only with pure fiction but with copious extracts from previous writers on the Pacific Ocean worlds of the Marquesas and Tahiti. When Melville came to his next work, the less-autobiographical but much more philosophical *Mardi*, with its more fictional island settings, he was ready to tackle modern geology and the doubts that came along with an expanded vision of time. On *Mardi*'s Isle of Fossils, Melville's philosopher Babbalanja discourses with the historian Mohi about the meaning of fossils and geological stratification. Although Melville was no expert geologist, the implications and ramifications of modern science were clearly not lost on him. And although the rantings of Babbalanja are not particularly coherent or conclusive, they pave the way for subsequent intersections of Melville's heretofore neo-Platonic world (as in *Moby-Dick*) and more barren intellectual landscapes (as in "The Encantadas," Melville's own 1854 treatment of the Galapagos Islands).

Melville may well have begun the study of paleontology with his frequently consulted serialized volumes of the English *Penny Cyclopædia*, which in 1838 purveyed the general view of "many successive creations of life in the globe" (Bercaw no. 544).[2] This was the view espoused by Richard Owen, the founder of paleontology, who around this time (1841) had coined the term "dinosaur."[3] Melville's interest in the geology of Charles Lyell (1797–1875)—which advanced the idea that geological processes work slowly but uniformly over huge periods of time—and evolution as presented in Robert Chambers's anonymously published *Vestiges of the Natural History of Creation* (1844) was established by Elizabeth Foster and Tyrus Hillway in their examinations of the sources of *Mardi* sixty years ago.[4] Even earlier than Melville's encounter with Chambers, the *Penny Cyclopædia* may have fossilized the image of the mastodon in Melville's literary mind through its depiction of a complete, reconstructed skeleton. After all, Melville, who famously referred to the sperm whale as a "salt-sea Mastodon" in chapter 14 of *Moby-Dick*, probably didn't need the *Penny Cyclopædia* to introduce him to these extinct elephants because, as Darwin had written in *Journal of Researches*, "the account of the multitude of bones of the mastodon and elephant, which have been discovered in the salt-licks of North America, is familiar to everyone."[5] And we know that Melville read Darwin before Darwin was *Darwin*—which is to say, before the publication of *The Origin of Species* in 1859.

In January 1854, while Melville was renewing his acquaintance with Darwin, "The Tortoise Hunter" (Melville was working on a presumably autobiographical

piece by this title at the time) may have been attracted to news of an interesting dinner party that had been held on New Year's Eve. Dinner parties were not an unusual pleasure in Victorian England and reading about them was not an unusual form of entertainment, but this particular event was considered unique in that it signaled an interest that had come to consume most levels of society on both sides of the Atlantic. An artist's rendering of the outstretched wing of a pterodactyl served as the medium for the invitation text that had been sent to approximately twenty-one potential guests—members of the press, prominent scientists, and senior officials of the Crystal Palace, a huge glass and iron exhibition hall. These men dined in the belly of an *Iguanodon*—that is, in a replica that was in the process of being created by Benjamin Waterhouse Hawkins. Among the party was Professor Richard Owen, who worked closely with Hawkins and was in charge of the Dinosaur Park exhibit that was home to other specimens that fulfilled Hawkins's purpose: to "teach through the eye."[6]

Artists like John Millais and poets like Alfred Tennyson approved of Hawkins's work, but the scientific community doubted his accuracy and Owen's credentials.[7] Owen's belief in the catastrophic view of history—that all changes that have occurred in the universe are due to unusual events like floods or earthquakes—was evidenced in the exhibit handbook as well as in the exhibit itself. He never gave credence to the ideas expressed by the most explosive natural philosophy of the time: transmutation. Greatly informed by Charles Lyell's uniformitarianism, this theory hypothesized gradual change from one species to another over long periods of time. That changes are uniformly and consistently occurring on earth was becoming the standard belief of trained, professional geologists. But as Nancy Marshall notes, "For Owen, progressive biological change observed through time represented not evolution but a striving toward a divinely created archetype that followed the natural laws of God." His dinosaurs were part of God's great, staged design, and the location of the dinosaurs in the park was meant to illustrate that they were a digression from the centrality of humans in God's plan. Moreover, "the placement of the models on islands in lakes [in the dinosaur exhibit] supplied by the complex waterworks of the park associated these distant eras with water so as to hint at the great Mosaic flood . . . supplemented by a special engineering arrangement that led to a tidal rise and fall of the pools' depths."[8] This contrivance related the exhibit to catastrophism rather than transmutation. By 1855, however, the Crystal Palace management, believing his reconstructions were already scientifically out of date, terminated their agreement with Hawkins. This was the backdrop to Melville's visit two years later.

On April 23, 1857, concluding a grand tour of the Mediterranean and the Holy Land undertaken in part to restore a wavering faith in traditional religion, Melville passed by train not six miles from Neanderthal, the valley where fossils subse-

quently called "Neanderthal man" had recently been unearthed. Melville traveled through the area only weeks after Hermann Schaaffhausen, a renowned professor of anatomy at Bonn, presented the discovery to the scientific world, and for someone interested in mastodons and geology, the event must have been significant. Melville may have recalled reading Charles Lyell's discussion in *Elements of Geology* (Bercaw no. 459) about the earlier discoveries in Belgium of similar impossibly old remnants, which were found in a cave in Engihoul. Schaaffhausen later reported on the findings: "In the early part of the year 1857, a human skeleton was discovered in a limestone cave in the Neanderthal near Hochdal, between Dusseldorf and Elberfeld. Of this, however, I was unable to procure more than a plaster cast of the cranium . . . from which I drew up an account of its remarkable conformation, which was, in the first instance, read on the 4th of February, 1857, at the meeting of the Lower Rhine Medical and Natural History Society, at Bonn."[9]

A fortnight after Schaaffhausen's first announcement, while still in the midst of Italian grandeur and ruin, the prehistoric had been on Melville's mind. On March 27, as he toured the Museum of Natural History in Rome, he noted in his journal that he saw a "dragon," and he also remarked that he'd come upon "the four fountains—Monte Cavallo—colossal horses from ruins of baths," which he associated with "finding the bones of the mastodon—gigantic figures emblematic of gigantic Rome."[10] Here he echoes, accidentally it would seem, Darwin's conjunction of horses and mastodons at several points in *Journal of Researches*, which Melville had recently used in "The Encantadas" and to which he would return in the "doubtful" landscape of *Clarel*:

> As the notices of the remains of several quadrupeds, which I discovered in South America, are scattered in different parts of this volume, I will here give a catalogue of them. After having enlarged on the diminutive size of the present races, it may be of interest to see that formerly a very different order of things prevailed. First, the megatherium, and the four or five other large edentata, already alluded to; 6th, an immense mastodon, which must have abounded over the whole country; 7th, the horse (I do not now refer to the broken tooth at Bahia Blanca, but to more certain evidence); 8th, the toxodon, an extraordinary animal as large as a hippopotamus; 9th, a fragment of the head of an animal larger than a horse, and of a very singular character; 10th, 11th, and 12th, parts of rodents—one of considerable size; lastly, a llama or *guanaco*, fully as large as the camel. All these animals coexisted during an epoch which, geologically speaking is so recent, that it may be considered as only just gone by.[11]

Once Melville arrived in London, he found his way to the Crystal Palace, as so many tourists did, and stood overlooking the grounds that included the Dinosaur Park. The exhibits there were the first life-size replicas of prehistoric creatures any-

where in the world—a sort of Darwin's list brought to life.[12] The grounds that held the park mirrored the inside of the palace, which implied that "a glorious future [was] still before [Britain]."[13] The landscape Melville saw reflected a hierarchy of British technical power: at the top, the precisely designed landscape directly attached to the building—a paean to man's technological advancement. He could walk to the terrace and see an ornate, Italianate garden, which would blend into the next tier, further removed from the building. This would have been the meticulously tended "natural" English garden. But hidden from the terrace view was the lower rung of the hierarchy: the ancient—red in tooth and claw—resided at the bottom of creation as well as in the layout of the gardens.[14] Even if he did not deliberately meander down the path, he most likely saw the exhibit from the train that took the patrons from London to Sydenham, where the building and exhibits had relocated after six months as the "Great Exposition."[15] On the train, the passengers could purchase a Dinosaur Park guidebook, Owen's *Geology and Inhabitants of the Ancient World*, and could read along as the cars rolled past the lower view and bottom rung of the landscape hierarchy—the prehistoric world as imagined by its creators, Hawkins and Owen.[16] All this tidiness and progressivist vision would unravel entirely as Melville brooded on the dessicated and petrified remnants of the Holy Land with its ratification of the postlapsarian vision on which he had based his literary aesthetic since "The Encantadas."

Later this same year, as so many famous tourists and travelers would, Melville lectured American audiences on artistic form in relation to what he'd seen during his recent European and Middle Eastern excursion. It seems only natural that he would have touched upon the Crystal Palace, the most talked-about commercial structure in the West. Melville had a special interest in the building: his stream-of-consciousness travel notes from the spring of 1857 associate the structure with other "mastodons" of architecture and engineering: "Chrystal [*sic*] Palace—digest of universe. Alhambra—House of Pansi [Pansa, Pompeii]—Temple of—. &c&c&c.—Comparison with the pyramid.—Overdone. If smaller would look larger. The Great Eastern. Pyramid.—Vast toy. No substance. Such an appropriation of space as is made by a rail fence. Durable materials, but perishable structure. Cant exist 100 years hence.—Beautiful view from terraces of Chrystal Palace."[17] Merton Sealts, who reconstructed Melville's lectures for publication, said that Melville was "enlarging upon a well-worn concept when, in his lecture on Roman sculpture in 1858, he called the Vatican 'the index of the ancient world, just as the Washington Post Office is the modern' and when he asked, 'If the Coliseum expresses the durability of Roman ideas, what does the Crystal Palace of modern London merchants express? Will glass endure as well as travertine?'"[18] Melville cites *Childe Harold's Pilgrimage* as his answer: "While stands the Coliseum, Rome shall stand; / When falls the Coliseum, Rome shall fall; / And when Rome falls,

the world."[19] Melville recognized that the thin tissue of optimism that kept the conventional interpretation of the Crystal Palace intact would disintegrate—that the real message of the Crystal Palace, inherent in its paleontological representations, was dissolution and decay.

His lectures were not successful, and 1858 saw Melville plunging into the world of poetry.[20] While Melville was apparently absorbed in the events of the Civil War, Thomas Henry Huxley published *Evidence as to Man's Place in Nature* and Lyell published *Geological Evidences of the Antiquity of Man* (both 1863; Bercaw no. 460). If Melville saw these works when they were first published, they don't seem to have found a place in his next book, *Battle-Pieces* (1866). By the late 1860s, he was beginning an immersion in the works of Matthew Arnold, whom he had read during the war but to whom he returned in 1867, 1869, and 1871 (Sealts no. 151).[21] If he was feeling somewhat of an ancient of days himself, he probably did not find much solace in Arnold's pessimistic *Empedocles on Etna*. But by 1871 events came to a head in New York City that would serve to connect him once again to his geological roots, as New York toyed with its own version of the Crystal Palace and even courted one of the key players from Sydenham.

Hawkins's artistic lectures on anatomy were popular after he left the Crystal Palace project (he was much more successful in this arena than Melville), and, according to Bramwell and Peck, in mid-March 1868, he ventured to the United States, where he gave lectures at the Cooper Institute with titles such as "The Form and Structure of Animals as Fitting Them to the Conditions of Earth, Air, or Water in Which They Live." In late March he lectured to an audience of about three thousand at the Lyceum of Natural History, later the New York Academy of Sciences.[22] The following morning, the *New York Times* raved that "nothing was more important than a knowledge of natural history" and parroted Hawkins's claim that "the Darwinian theory of the development of the species could not be believed by any comparative anatomist. . . . the unity of design in nature showed the hand of God Himself."[23] Soon after, city officials commissioned him to create the American version of the Dinosaur Park in Central Park. No one was troubled by theological threats: despite a wealth of fossil and glacial evidence, in 1871 American geology still followed comfortably in the footsteps of Louis Agassiz (1807–73), America's most popular (although naturalized) geologist, who adamantly refused to accept that his own observations supported Darwinian theory. In his essay "The Silurian Beach," Agassiz has no trouble rolling back geological time to arrive at a traditional creation:

> To me it seems, that to look on the first land that was ever lifted above the waste of waters, to follow the shore where the earliest animals and plants were created when the thought of God first expressed itself in organic forms, to hold in one's hand a bit

> of stone from an old sea-beach, hardened into rock thousands of centuries ago, and studded with the beings that once crept upon its surface or were stranded there by some retreating wave, is even of deeper interest to men than the relics of their own race, for these things tell more directly of the thoughts and creative acts of God.[24]

With recent paleontological discoveries in New Jersey, Connecticut, Wyoming, and elsewhere, railroad barons like Andrew Carnegie and bankers like George Peabody were anxious to bring the "American monsters" to the people of the city, and the idea of a paleozoic museum was born.[25]

Joseph Leidy, America's most famous paleontologist, who had discovered *Hadrosaurus foulkii* in Haddonfield, New Jersey, in 1858 (the year that New York's own Crystal Palace had burned to the ground), worked with Hawkins on his models, lending him fossil specimens and offering his expertise. Hawkins developed the first "fully articulated dinosaur skeleton in the world,"[26] which was such a wildly popular exhibit at Philadelphia's Museum of the Academy of Natural Sciences that officials had to limit open admission so the crowds wouldn't damage other exhibits.[27]

Hawkins took castings of the *Hadrosaurus*, along with other significant specimens, to his studio in Central Park where he began work on his display. But after some time had elapsed and his building for the museum had not been built, he began to question those in charge about the delay, complaining to the Lyceum on March 6, 1871, about mismanagement by the city.[28] Unfortunately for the artist, he had angered William M. "Boss" Tweed who, most likely, had slowed the project; Tweed wanted a share of the action. On May 3, most of the contents of Hawkins's studio were destroyed by Tweed's "gang" and "buried in the hole dug for the museum's foundation."[29] The *Times* later reported that Hawkins found some of the bones buried in Mt. Vincent, a neighborhood near the park, where one of Tweed's men, Judge Henry Hilton, lived.[30]

All of this was big news in New York City—and it forms the most public part of the background to Melville's return to the intersection of geology and faith that he treats so methodically in the Holy Land of *Clarel* and so flippantly in the cave at Engihoul of "The New Ancient of Days."

More than any of his other works, the last canto of *Clarel*, Melville's self-searching 1876 epic of faith, and the undated fugitive poem "The New Ancient of Days," an irreverently playful and satirical lyric, share the language and religious implications of evolutionary science. The year of the greatest flowering of evolutionary thought in America, 1871–72, saw not only the publication of Darwin's *Descent of Man* (1871) but also new editions of *The Origin of Species* (1872), Charles Lyell's *Antiquity of Man* (1871; orig. 1863), and Thomas Henry Huxley's *Man's Place in Nature* (1872; orig. 1863). In the absence of international copyright, U.S. publishers

Appleton and Lippincott were competing for readership: the latter had Lyell, but in an eight-page supplement to the 1872 edition of *Evidence as to Man's Place in Nature*, Appleton listed for sale nine titles under the heading "The Descent of Man," including works by Darwin, St. George Mivart, Spencer, Huxley, Darwin's cousin Francis Galton, French prehistorian Louis Figuier, and John Lubbock. Those years also saw the baptism of Melville's wife, Lizzie, and the deaths of his close literary friend Henry T. Tuckerman, his uncle John D'Wolf, his brother Allan Melville, and his mother, Maria Melville.[31] If ever there was a year in the Melville household that required faith, this was it. But Herman would not find it. During these years and those that immediately followed, Melville reflected his own wrestling with the demon time not only in the balanced possibilities of *Clarel* but also in the reckless capitulation of "The New Ancient of Days."

The iambic pentameter epilogue of *Clarel* reads much as a puzzle in the tradition of Chaucer's "Retractation," in which that often irreverant poet revokes his previous "worldly vanitees." After 150 cantos following his group of pilgrims on an excursion in the Holy Land, in which different characters seem to represent (and discuss at length) different degrees of faith, skepticism, and inquiry, Melville concludes a dismal, doubt-ridden journey with an exhortation to faith. If the iambic tetrameter form of the body of the poem itself is meant, as Walter Bezanson suggests in his commentary,[32] to dissociate the reader from the decasyllabic tradition of Chaucer, Shakespeare, and especially the epic Milton, then the epilogue must carry the intention to return the reader to that tradition. Despite the structural centrality of *Clarel*'s Anglican churchman Derwent, who at least conversationally dominates the last three of the poem's four parts with a Wordsworthian/Emersonian testament of acceptance, it is apparent that *Clarel* is no exemplar of paradise regained. In the epilogue, the trio of leaps of faith complicates an attentive reading of the poem:

> If Luther's day expand to Darwin's year,
> Shall that exclude the hope—foreclose the fear? (IV.35.1–2)
>
> Even death may prove unreal at the last,
> And stoics be astounded into heaven. (25–26)
>
> Emerge thou mayst from the last whelming sea,
> And prove that death but routs life into victory. (33–34)

In the first of these couplets Melville shies away from the implicit argument of his own epic, answering his final, beseeching question with the tentative but hopeful "may" and "mayst" of the other two couplets. Earlier in the poem Melville already disposed of what he regarded as superficial scientific inquiry when he banished a geologist caricature named Margoth from the poem (Margoth leaves the group of pilgrims in part 2) and replaced him with Mortmain, one of the

major (and deeper-diving) skeptics of the poem. Mortmain himself is killed off in part 3 and replaced thematically by the spiritually and literally burned-out Civil War veteran Ungar, whose face has been scarred by burning powder and who suffers from what today we would surely call post-traumatic stress disorder. Believers disappear too, and one of the first to go is Nehemiah, an innocent evangelist who fails as a guide to the eponymous Clarel, a young student in search of faith. Nehemiah apparently, with thematic appropriateness, sleepwalks into the Dead Sea and drowns. But the deaths and disappearances are not judgments; they cannot be, for they are material and temporal, and the questions to be answered are spiritual and timeless. Hence Clarel's arrival at the end of the epic with much soul searching but even less evidence to buttress his faith. "Luther's day" probably alludes to the strict time span of the Mosaic account of creation, while "Darwin's year" refers to the immense difference in time recognized by latter-day geologists—even those who acknowledged the new time scale while disavowing the impact of such a scale on an acceptance of the literalness of biblical events. Since there was not a prayer that his epic would ever see commercial publication, we hesitate to foist on Melville any suggestion that the lines that conclude this poem are there to appease the stolidly pious Victorian common reader. They *must* pertain to Melville's own spiritual conclusions, contradictory as they may be to the experience of the pilgrimage.

But there is another "epilogue" to *Clarel*, one that may suggest an arbitrariness to the restrained optimism of the published conclusion of *Clarel*. Taking the other extreme, away from the dignity of blank verse, Melville turns to doggerel in "The New Ancient of Days," playing on the notion of geological time and iconoclastically challenging comfortable orthodoxy.

"The New Ancient of Days" is an undated manuscript poem in the same manuscript collection as *Billy Budd* at Houghton Library of Harvard University. To date the poem, one would normally compare the paper of the Houghton draft to that of Melville's correspondence and other dated manuscripts. But Houghton's Dennis Marnon tells us that the correlations among paper and texts aren't clear enough to provide an accurate date.[33] It seems safe to say, however, that although "New Ancient" is a commentary or intellectual footnote to *Clarel*, it was not intended to be part of the published version of *Clarel* or even to be read alongside the epic. In *Clarel*, Melville had, for once, total artistic control over the production of a major work and he exercised it—and "New Ancient" isn't present in the published poem. It is, instead, a jeu d'esprit, and we have far less assurance that it reflects any real sense of Melville's struggle between faith and doubt. One could see this as exactly the kind of thing a man who had been grindingly serious throughout the composition of an epic might share with a friend over cakes and ale—if he had such a friend, which in the years leading up to the publication of *Clarel* Melville clearly did not. Having experienced the passing of, or alienation from, Jack Chase

avatars Richard Henry Dana Jr. (1815–82), Nathaniel Hawthorne (1804–64), and Henry T. Tuckerman (1813–71), Melville had no reason to prepare a clean draft of "New Ancient" because there was no one to read it to; soul mate Jack Chase, who appears as a highly literate sailor (he recites Camoens) in Melville's naval romance *White-Jacket* (1850) and to whom Melville dedicated *Billy Budd*, had simply disappeared. Melville's infatuation with Dana, a fellow sailor and the author of *Two Years before the Mast* (1840), seemed to evaporate when Melville met Hawthorne in the summer of 1850, but Hawthorne died during the war. Tuckerman, a fellow New Yorker who wrote extensively on literature and politics and who was Melville's most recent artistic mentor, died in 1871—at the start of what we would call "Darwin's year." So the poem lay dormant; nobody knows for certain exactly when Melville began it or finished tinkering with it. It remained in a rough but probably finished draft at the time of Melville's death in 1891.

"The New Ancient of Days" was published by Raymond Weaver, the first of Melville's editors, in the *Poems* volume of the Constable edition of Melville's works in 1924. Weaver's transcription can realistically be regarded only as an unwitting fantasy collaboration between Melville and Weaver. It should be remembered, however, that Weaver transcribed the poem's difficult manuscript cold in the midst of preparing the rest of the Constable volume. At the end of this essay, we have provided a reading text that benefits from the previous attempts at transcription by both Weaver and Howard Vincent, and from the focused attention of fellow Melville scholars.[34] Our newly transcribed text speaks more clearly for itself than do earlier versions, but we have nevertheless thought it wise to provide a commentary. And as our commentary will show, a careful reading of the scientific and religious context from which Melville wrote is very important for developing a full reading of the poem. We explore the poem's relation to the sources of Melville's knowledge of the evolution debate through a series of observations on individual readings that may be obscure to the reader (or may never even have been recovered before from the manuscript). Melville was engaged with the pretensions of religions of all varieties and was saturated with the vocabulary and themes of the new geology.

The immediate intellectual context for "New Ancient" is Lyell's *Geological Evidences of the Antiquity of Man*, published in 1863 but reprinted in America in the critical year 1871.[35] Melville acknowledges this in his note to the title of the poem. He does not, however, immediately acknowledge Darwin: the addition of "and Darwin's Descent of Species" not only falls outside Melville's original parentheses, it confuses the titles of *The Descent of Man* (1871) and the famous sixth edition of *The Origin of Species* (1872). It is entirely possible that Melville never read either of the Darwin books, concentrating more on the direct geological implications of Lyell than on the systematic theory of Darwin. Lyell provided Darwin with the time scale necessary to allow natural selection to operate, but Melville took Lyell's

geological time and its attendant evidence of non-Adamic humans to dismantle the received religious narratives of creation. Moreover, only Lyell and Ludwig Büchner (in his 1872 *Man in the Past, Present and Future*) make anything at all out of the cave at Engihoul, which plays such an important role in "New Ancient," and Büchner cribs verbatim from Lyell. Huxley briefly mentions Engihoul, but not in a way, we think, that would engage Melville's imagination.[36] The discoveries at Engis and Engihoul of fragments of very early human bones took place a quarter of a century earlier than the discoveries in the Neander valley that had just been announced when Melville traveled within a half-dozen miles of the place in 1857. Perhaps Melville's choice of Engihoul derives from Lyell's emphasis that the sites at Engis had been destroyed by the time Lyell got there, but Engihoul had been preserved:[37] "On the right bank of the Meuse, on the opposite side of the river to Engis, is the cavern of Engihoul. Both were observed to abound greatly in the bones of extinct animals mingled with those of man; but with this difference, that whereas in the Engis cave there were several human crania and very few other bones, in Engihoul there occurred numerous bones of the extremities belonging to at least three human individuals, and only two small fragments of a cranium."[38]

Melville had long been familiar in general with the kind of fauna associated with the caves; he had seen "Cuvier's mastadon" in his *Penny Cyclopædia* and had used the image famously in chapter 14 of *Moby-Dick*: "That Himmalehan, salt-sea Mastodon." Among the 1846 Boston donors of the Harvard mastodon skeleton were a couple of Shaws (Melville married into the Shaw family), and Melville may have seen the skeleton itself. "Cuvier's" in line 4 is an early revision in ink: "mastadon" came to the author's mind immediately, but the specification may have depended on Melville refreshing his memory elsewhere (as from Lyell).[39] Melville habitually reinforced his memory by consulting reference books: in his prose works the resulting interpolations can often be identified with specific editions of the works in question; in his poetry it is harder to trace borrowings and thus harder to trace the process by which Melville composed a poem. The absence of extended borrowings in this case is made up for by the survival of the drafts of the poem—not the situation for most of Melville's prose works.

Carrisbrook well is an odd image in the second stanza (line 24): this was a well at Carisbrooke Castle on the Isle of Wight that was so deep (or so frequently used) that the water was drawn by means of a donkey on a treadmill. Melville may have been reminded of it by the similar-sounding Carriden wall mentioned by Lyell, which faces the running head "Fossil Whales Near Stirling."[40] The well image is an apt one for Melville, who in *Clarel* has Derwent employ the trope:

> Alas, too deep you dive.
> But hear me yet for little space:
> The shaft you sink shall strike no bloom:

> The surface, ah, heaven keeps *that* green;
> Green, sunny: nature's active scene,
> For man appointed, man's true home.[41]

Moses's stool (or seat, to clarify Melville's biblical allusion to Matthew 23:2 in line 26) is prominent (although not so prominent as the *cornua*, or traditional horns, of Moses) under the statue in San Pietro in Vincoli, Rome, which Melville visited on the 1856–57 tour. Lyellian time, figured here as the man from the cave, simply kicks the foundation out from under the Mosaic account, which Jesus had endorsed in contrast to the hypocrisy of scribes and Pharisees.

The first three members of Melville's "Barnum show raree" (lines 29–31)—*Megalosaurus*, *Iguanodon*, and *Palæotherium*—were in fact created for the Crystal Palace park. Melville may have known that a mastodon and glyptodon were planned but not completed for the London set. Weaver "corrects" Melville's "Glypthæcon" to "glyptodon," while Howard Vincent in *Collected Poems* reverts to Melville's spelling but omits the punctuation that indicates two different animals. There is no reason Melville should have limited himself to the actual animals found in association with the Engihoul remains, or even to real animals, but earlier editors seem to have struggled with inaccuracies that may be part of Melville's intentional free-for-all tone, which belittles traditional faith (even to the Adamic naming of animals) while keeping his iconclastic man from the cave as little liable to self-inflation as possible. Of course, Melville's spelling of these names is atrocious, but "Glypthæcon" is not an accidental spelling—no one *hears* an a/e ligature. Through error or playfulness Melville may have been combining glyptodon and some other name, or he may be accurately reporting a name he saw somewhere else (for instance, during the hoopla surrounding the 1871 vandalism of Hawkins's Central Park figures). In a superseded passage, Melville ended the list with "And wooly old horses three": the *Penny Cyclopædia* listed four species of modern equine (horse, ass, zebra, and quagga), while by 1874 the Yale paleontologist Othniel C. Marsh identified three Pliocene genera of fossil horses and more than twenty species. Of true *Equus*, Marsh finds five or six species.[42] Melville's allusion remains elusive, but we can be sure that in the context of the evolution debate Melville would not hesitate to extrapolate according to his own imagination for the purpose of humor.

Perhaps the most allusive (and elusive to earlier editors) stanza is that beginning with "Obstreperous" (line 52). Joe Smith (line 53) is the founder of Mormonism, but Weaver's (and, derivatively, Vincent's) "Jones Three" is actually "Tores Three" (line 53), a reference to giants of Norse mythology. "Jos" in Weaver's and Vincent's versions of the poem is actually "Fos" (line 54), a plural form of the Chinese Buddha who also appears in *Clarel*.[43] Melville clearly inserts "Mahone" (line 54), but the allusion is to Mahoun, a derogatory term for the Prophet of Islam. Melville

gives equal opportunity to the targets of the mischief of the man from the cave: if the variety of disputants in *Clarel* maintains tolerance and respect for most of their pilgrimage, the man from the cave feels no such restraint, a Huxleyan figure gleefully flaying his opponents. The phrase "puling babe" (line 59), as opposed to Weaver's "parting bake" or Vincent's "parting take," is Dennis Marnon's correct reading of Melville's hand. "Pliocene" (line 59) is the correct term for the geological era and is what Melville wrote; "Phocene" is an invention of Weaver passed on without suspicion by Vincent, showing not so much the ignorance of the editors as their distance from the debate over evolution, which was absent from popular discussion when these scholars worked in the early 1920s and late 1940s, respectively. (The famous Scopes "monkey" trial of 1925 was on the horizon for Weaver but a world war behind for Vincent.)

"Ens" (line 60) is a philosophical term for "being" or "essence." "Every such truth is the absolute Ens seen from one side," Ralph Waldo Emerson had written in *Nature* (1836), and the term's presence in this poem suggests Melville's unending fixation on the mellow American optimist, a diver after truth who nevertheless came to conclusions too easy for Melville. The following stanza continues the allusions with less elusiveness: the "Grand Pan-Jam" (line 67), a term reflecting a particular kind of organizational vanity, was replaced in the wider culture by "Grand Pooh-Bah" after Gilbert and Sullivan's *The Mikado* was produced in 1885.

Although Lyell's *Antiquity of Man* gave Melville the name and bare facts of the cave of Engihoul, Melville obviously ranged widely in the myriad details of the poem. But in theme he remains largely Lyellian. If Melville found a context for his showman of Engihoul in Lyell's fourth chapter, on the discoveries in the Belgian caverns, he probably found in Lyell's twentieth through twenty-second chapters Lyell's measured consideration of the conflict between progressivism (the idea that as time passes "higher forms" appear) and transmutation (the idea that species change from one to another) through Darwin's natural selection. Coincidences of pronunciation suggest Melville's retention: Could the name of Lyell's Dr. Malaise (a real person) have suggested the name Margoth, the geologist of the second part of *Clarel*?[44] Could his Morton have suggested the similarly rooted name Mortmain, who dies at the end of part 3?[45] Could Lyell's transmutationists, "astounded at the confidence placed by the progressionists," be themselves astounded into heaven at last, as Melville speaks of skeptics in the epilogue? The faith of progressionists, Lyell wrote at the conclusion of chapter 20, "in the fulness of the annals leads them to regard all breaks in the series of organic existence, or in the sequence of the fossiliferous rocks, as proofs of original chasms and of the creational force."[46] Melville read the inhabitant of the cave at Engihoul as just the man to leap into one of these chasms, with his "fossilifers stone" (line 55), a pun so good Melville reprises it (line 73).

More immediately for the purposes of the poem, Lyell clearly ratified for Melville the antiquity of man: according to Lyell, Philip Carel Schmerling, the discoverer of the remains at Engihoul, "had accumulated ample evidence to prove that man had been introduced into the earth at an earlier period than geologists were then willing to believe."[47] Lyell's chapter 21, "On the Origin of Species by Variation and Natural Selection," reviewed the progress of a debate Melville may have encountered only through popular culture, but Melville would have attended to it as the progress of an old literary acquaintance, the sailor-observer of *Journal of Researches*. In this chapter Melville would have been reminded of *Vestiges of Creation* and his handling of geology in *Mardi*. Having been published originally in 1863, Lyell's book could not have summarized *The Descent of Man*, but Melville may have seen the title mentioned in Appleton's rather overwhelming advertisement of 1872. The great glee taken by Melville's man from the cave at Engihoul is the overthrow of time—and with it, history and especially mythology. The great threat that Darwin proved real to nineteenth-century science and religion was Lyellian: the immensity of time or, as Melville hinted in the epilogue to *Clarel*, "Darwin's year." As long as there was no discernible mechanism for evolution, or as long as a proposed mechanism fit within conventional concepts of a purposely built universe, change and even extinction could be accommodated. In proposing natural selection, Darwin did not of course invent evolution, but he did annihilate the necessity for a creator or even progressivism—and certainly annihilated nineteenth-century "punctuated" progressivism, the discrete creation of successive species. Simultaneously, Darwin reinforced the need for time on a geologic scale.

In "New Ancient," if not in *Clarel*, Melville recognized and embraced the Darwinian emancipation from temporality and teleology as delivered by Lyell. By the 1870s, Melville had moved beyond the kind of confrontational inquiry embodied by Captain Ahab in *Moby-Dick* and that Hawthorne had described after his meeting with Melville in Liverpool in 1856: "He can neither believe, nor be comfortable in his unbelief; and he is too honest and courageous not to try to do one or the other."[48] Nowhere does Melville more directly and extensively examine questions of faith and doubt than in *Clarel*, and in Clarel himself surely rests the dilemma of trying to do one or the other. But if in the conclusion (however disconnected it appears from the intellectual agonies of *Clarel*) Melville opts for the first, in "The New Ancient of Days" he quite comfortably does the other. His man from Engihoul is a sarcastic iconoclast, a more playful prototype (or evolutionary ancestor) of the geologist Margoth—perhaps even owing something to the 1872 *Hornet* caricature of Darwin as a knuckle-dragging ape. In grinning like the Gorgon, the man from the cave at Engihoul turns all to stone. At the end of *Clarel*, there is spirit above the dust, but at the end of "The New Ancient of Days," there is only "fossilifers stone."

Melville paid for the publication of his eighteen-thousand-line epic of doubt in 1876 with funds left by his uncle Peter. No one read *Clarel*, and even though he owned them outright, Melville ordered the unsold copies to be pulped. He never published "The New Ancient of Days" at all, avoiding both the joy of publication and the disappointment of critical rejection. But the existence of the poem among his literary relics provides an alternative gloss to *Clarel*: if his epic was the public utterance of deep doubt, "The New Ancient of Days" was Melville's inside joke. The cave of Engihoul provided a truth that triumphed over even the bitterness of doubt.

The New Ancient of Days.
(See Lyell's Antiquity of Man)
and Darwin's Descent of Species

The man of bone confirms his throne
In cave where fossils be;
Outdating every mummy known,
Not older Cuvier's mastadon,
Nor older much the sea:
Old as the Glacial Period, he;
And claims he calls to mind the day
When Thule's king, by reindeer drawn,
His sleigh-bells jingling in icy morn,
Slid clean from Pole to the Wetterhorn
Over frozen waters in May!
Oh, the man of the Cave of Engihoul.
With Eld doth he dote and drule?

A wizzard one, his lore is none
Ye spell with A. B. C.
But *do-do* tracks, all up and down
That slate he poreth oft [*or* much] upon,
His algebra may be:—
Yea, there he cyphers and sums it free;
To ages ere Indus met ocean's swell
Addeth æons ere Satan or Saturn fell.
His totals of time make an awful schism,
Old Chronos he pitches adown the abysm
Like a pebble down Carrisbrook well.
Yea, the Man of the cave of Engihoul
From Moses knocks under the stool.

In *bas relief* he late has shown
A horrible show, agree—

Magalosaurus, igwanadon,
Palæotherium—Glypthæcon—
    A Barnum show raree:
The vomit of slimy & sludgey sea
Purposeless creatures, lame inchoate things
Which splashed thro' morasses on fleshly wings;
The cubs of chaos, with eyes askance,
Presposterous griffins that squint at Chance
And Anarch's cracked decree!
    Oh the showman who dens in Engihoul,
    Would he fright us, or quiz us, or fool?

But needs to own, he takes a tone
    Satiric on nobs, pardee!
"Though in ages whose term is yet to run,
Old Adam a seraph may have for son's son,
    His gran'ther's a sponge, d'y'see!
And why cut your kinsman the ape?" adds he:
["]Your trick of scratching is borrowed from him,
Grimace and cunning with many a whim,
Your fidgets and hypoes, and each megrim—
All's traced in the family tree!"
    Ha, the wag of the cave of Engihoul:
    Buss me, gorilla and ghoul!

Obstreperous grown he'd fain deth[r]one
    Joe Smith an e'en Tores Three:
Against even Fos and great Mahone
He flings his fossilifers stone
    And rattles his shanks for glee
I'll settle these parvenu fellows, he-he!
Diluvian Jove of Ducalion's day—
A puling babe to the Pliocene clay!
He swears no Ens nor takes a name
Commensurate is with the vasty claim
Of the protoplastic Fegee.
    O, the spook of the Cave of Engihoul
    He flogs us & sends us to school.

Hyena of bone! Ah, beat him down,
    Great Pope, with Peter's key,
Ere the Grand Pan-Jam be overthrown
With Joe and Fos and great Mahone,
    And the firmament mix with the sea;
And then, my masters, where should we be?

But the ogre of bone he snickers alone,
He grins for his godless glee.
"I have flung my stone, my fossil stone,
And your gods how they scamper" saith he.
Imp! imp of the cave of Engihoul,
Shall he grin like the Gorgan and rule?
—edited by RDM (Sept. 8, 2013)

NOTES

1. Merton M. Sealts Jr., *Melville's Reading* (Columbia: University of South Carolina Press, 1988), no. 175. It is a tradition in Melville scholarship that the Sealts and Bercaw (see the next note) numbers be cited in the text, which will be done subsequently.

2. *The Penny Cyclopædia of the Society for the Diffusion of Useful Knowledge* (London: Charles Knight, 1838), 11:131; Mary K. Bercaw, *Melville's Sources* (Evanston, Ill.: Northwestern University Press, 1887), no. 544.

3. Nancy Rose Marshall, ""A Dim World, Where Monsters Dwell': The Spatial Time of the Sydenham Crystal Palace Dinosaur Park," *Victorian Studies* (Winter 2007): 286–301.

4. Elizabeth S. Foster, "Melville and Geology," *American Literature* 17 (Mar. 1945): 50–65; Tyrus Hillway, "Melville as Amateur Zoologist," *Modern Language Quarterly* 12 (June 1951): 159–64; Elizabeth S. Foster, "Another Note on Melville and Geology," *American Literature* 22 (Jan. 1951): 479–87.

5. Charles Darwin, *Journal of Researches* (London: Henry Colburn, 1839), 153.

6. Valerie Bramwell and Robert M. Peck, *All in the Bones: A Biography of Benjamin Waterhouse Hawkins* (Philadelphia, Pa.: Academy of Natural Sciences of Philadelphia, 2008), 24, 55. Joseph Paxton's design for London's Great Exposition of 1851 was dubbed by *Punch* the Crystal Palace and was, beginning in 1854, the exposition's permanent home in Sydenham. "Heads of the People on the Removal of the Crystal Palace," *Punch* 21 (1851): 176.

7. Bramwell and Peck, *All in the Bones*, 26.

8. Marshall, "A Dim World," 294, 295.

9. Qtd. in Thomas H. Huxley, *Evidence as to Man's Place in Nature* (New York: Appleton, 1872), 149–50.

10. Herman Melville, *Journals* (Evanston and Chicago, Ill.: Northwestern University Press and Newberry Library, 1989), 115, 107.

11. Herman Melville, *Clarel: A Poem and Pilgrimage in the Holy Land* (Evanston and Chicago, Ill.: Northwestern University Press and Newberry Library, 1991), 394–97; Darwin, *Journal*, 104–5.

12. Bramwell and Peck, *All in the Bones*, 71.

13. Marshall, "A Dim World," 289.

14. Ibid.

15. Ibid., 299.

16. Ibid.

17. Melville, *Journals*, 128.

18. Merton M. Sealts Jr., *Melville as Lecturer* (Cambridge, Mass.: Harvard University Press, 1973), 151, 153.

19. Herman Melville, *The Piazza Tales and Other Prose Pieces* (Evanston and Chicago, Ill.: Northwestern University Press and Newberry Library, 1987), 409.

20. Herman Melville, *Published Poems* (Evanston and Chicago, Ill.: Northwestern University Press and Newberry Library, 2009), 439.

21. Walter Bezanson, "Melville's Reading of Arnold's Poetry," *PMLA* 69, no. 3 (June 1954): 365–66.

22. Bramwell and Peck, *All in the Bones*, 82, 36.

23. Benjamin Waterhouse Hawkins, "Unity of Plan in the Animal Kingdom," *New York Times* (Mar. 27, 1868): 5.

24. Louis Agassiz, *Geological Sketches* (Boston: Ticknor and Fields, 1866), 30.

25. Paul Semonin, "Empire and Extinction: The Dinosaur as a Metaphor for Dominance in Prehistoric Nature," *Leonardo* 30, no. 3 (1997): 175; Bramwell and Peck, *All in the Bones*, 36.

26. Bramwell and Peck, *All in the Bones*, 77, 79.

27. Ibid., 79.

28. "Meeting of the Lyceum of Natural History—Prof. Waterhouse Hawkins' Report on the Paleozoic Museum at Central Park," *New York Times* (Mar. 7, 1871).

29. Semonin, "Empire and Extinction," 174.

30. "Central Park. Plain Talk about New York's Great Pleasure Ground," *New York Times* (Nov. 25, 1871): 1.

31. Hershel Parker, *Herman Melville: A Biography* (Baltimore, Md.: Johns Hopkins University Press, 2002), 2:712–40.

32. Melville, *Clarel*, 568–69.

33. Personal communication.

34. Herman Melville, *Collected Poems*, ed. Howard P. Vincent (Chicago: Packard, 1947).

35. Charles Lyell, *The Geological Evidences of the Antiquity of Man* (Philadelphia, Pa.: Lippincott, 1871).

36. Huxley, *Evidence*, 144.

37. Lyell, *Geological Evidences*, 69.

38. Ibid., 65.

39. Ibid., 351.

40. Ibid., 52.

41. Melville, *Clarel*, 347.

42. O. C. Marsh, "Fossil Horses in America," *American Naturalist* 8, no. 5 (May 1874): 288–94.

43. Melville, *Clarel*, 23.

44. Lyell, *Geological Evidences*, 69–70.

45. Ibid., 79.

46. Ibid., 406.

47. Ibid., 68.

48. Parker, *Herman Melville*, 300.

PAUL OHLER

Darwinism and the "Stored Beauty" of Culture in Edith Wharton's Writing

EVOLUTIONARY HEREDITY AND AN "INSTINCTIVE" SOCIETY

EDITH WHARTON'S (1862–1937) construction in her fiction of a relationship between biological systems and human cultural systems was a response to ideas about evolutionary theory she encountered in the work of Charles Darwin and other major figures of the natural sciences. In this essay, I consider the use of evolutionary theory in her fiction, using details of Wharton's depictions of human culture that developed in tandem with biological evolution. Wharton's narratives of American culture directed and constrained by evolutionary principles include the short stories "The Angel at the Grave" (1901) and "The Descent of Man" (1904), the novels *The House of Mirth* (1905) and *The Custom of the Country* (1913), and others addressed only briefly here, such as *The Fruit of the Tree* (1907) and *The Age of Innocence* (1920). I address Wharton's intellectual commitment to Darwinism and its animation of literary characters in a metaphoric field seeded by the scientific works she studied.

My analysis of the forms Wharton's source texts take in her fiction advances from previous scholarly work on Darwin and Wharton[1] to focus on configurations of cultural change that are intimately tied to biological change. What emerges is a more nuanced understanding of her engagement with what was a multifarious Darwinism "in a state of disarray"[2] during the decade of Wharton's composition and publication of numerous works that developed evolutionary themes. In this decade, for example, Wharton began *The Custom of the Country*, a novel Cecilia Tichi describes as focusing on "a Darwinian process of encroachment and extinction"[3] in its representation of conflict between established and new class formations. Wharton's scientifically inflected fictional social analysis explores the

changing elements of American culture with language and ideas drawn from evolutionary texts, including pre-Darwinian works by figures such as Jean-Baptiste Lamarck (1744–1829). Wharton redirects these texts to dramatize and circulate to her wide readership her sense that "traditional society with its old-established distinctions of class, its passwords, exclusions, delicate shades of language and behavior, is one of man's oldest works of art, the least conscious and the most instinctive."[4] The yoking of art and instinct indicates a key feature of Wharton's Darwinian fictions, namely a tendency to deemphasize the view that culture is autonomous from biology. But the tendency encompasses a question asked in Wharton's time, one inhering in the notion of art as an activity that distinguishes *Homo sapiens* as a species concerned with cultural memory and its inheritance: Is the story of human evolution one of progress toward a preordained goal or one of increasing complexity without purpose?

Functioning as an outcome of deep evolutionary time, this "most instinctive" society is a major subject for Wharton, one informed by Darwin's readiness in *The Descent of Man* to view the moral faculty as a product of selection. He writes, "It must not be forgotten that although a high standard of morality gives but a slight or no advantage to each individual man and his children over other men of the same tribe, yet that an increase in the number of well-endowed men and an advancement in the standard of morality will certainly give an immense advantage to one tribe over another."[5] The Darwinian framework of descent with modification opened what seemed to be distinctly human traits to the possibility they were evolved, despite Darwin's initial hesitance. He expressed this in a letter to Alfred Russel Wallace, a co-discoverer of evolution by natural selection: "You ask whether I shall discuss Man: I think I shall avoid the whole subject as so surrounded with prejudices, though I fully admit that it is the highest and most interesting problem for the naturalist."[6] Wharton's focus in her fiction on Darwin's "interesting problem" extends it to morality, custom, and culture as evolved features of the human world. She presses in stories and novels for a rational, material view of transformation. Wharton, however, also intimates that the development of instinctive society implies evolution carrying forward a design or purpose. Her positive valuations of a strictly scientific understanding of the world in her fiction can seem inconsistent with a teleological view of cultural evolution traceable to Lamarckism. Where this inconsistency is present, such as in "The Angel at the Grave," which depicts a shift in beliefs as the evolutionary paradigm supersedes the cultural authority of transcendentalism, the outcome is an affirmation of empiricism as an ideal way to understand self and society. Wharton's Darwinian fictions attend to transformations in social environments indicated by disarray in class structures; shifting sensibilities about mating, marriage, and family; and the rapid dissolution of boundaries between highbrow and popular culture. This essay highlights these crosscurrents to illustrate

some of the ways Wharton's narratives interpret a contested Darwinism for her audience.

To consider the forms Wharton's source texts take in her fiction is to encounter her creative transformation of scientific theory into evolutionary metaphor directed toward diminishing the perceived gap between biological and cultural systems. Her fictionalization of science signals the impact of Darwin's ideas on the literature of the United States. But of one group so influenced, including, as Bert Bender argues, William Dean Howells, Henry James, Kate Chopin, and Charles W. Chesnutt, "only Edith Wharton is widely acknowledged to have studied and responded to Darwinian thought."[7] Her stories and novels link nature and culture through ideas such as descent with modification through natural selection, Mendelian inheritance, Lamarck's theory of the inheritance of acquired characteristics, and recapitulation or biogenetic law. In Wharton's hands, these theories suggest a biosocial dimension of her Progressive-era subjects. As a best-selling writer of serious fiction Wharton popularizes the natural science she presents, suggesting to readers associations between Darwinian theory and their day-to-day social interactions and customs. These translations of Darwinism into fiction thus open her work to Gillian Beer's question (which I take up here) about nonscientists engaging scientific discourses: "What happens when unforeseen readers appropriate terms and texts?"[8]

Because Wharton finds perspectives on human experience in foundational works such as Charles Darwin's *On the Origin of Species* and *The Descent of Man*, and in later works that extended, refined, and disputed their conclusions, we must examine her engagement with the major publications of Darwin and many other substantial contributions. Ernst Haeckel's *The Evolution of Man* (1874) and *The History of Creation* (1876), the essays of T. H. Huxley, and August Weismann's *The Evolution Theory* (1904), among others she studied, are addressed here only in brief. Wharton's well-known description of reading "Wallace's 'Darwin and Darwinism,' and 'The Origin of Species,' . . . Huxley, Herbert Spencer, Romanes, Haeckel, Westermarck, and the various popular exponents of the great evolutionary movement" relates an "overwhelming sense of cosmic vastness" that opened "magic casements . . . into our little geocentric universe."[9] Her close friend Walter Berry "recommended, as well as Huxley and Haeckel, the much earlier work of Augustin St Hilaire on botany, Georges Cuvier on comparative anatomy; and H. G. Wells for accessible scientific explanation."[10] In a 1908 letter she reports her reading of R. H. Lock's *Recent Progress in the Study of Variation, Heredity and Evolution* (1906) and that she is "deep in [Vernon] Kellogg's" *Darwinism Today* (1907),[11] two important works that considered evolution in Mendelian terms.[12] A month later she wrote again, this time with consternation at the difficulties involved in understanding "biophors and determinants . . . allelomorphs & heterozygotes in

Lock's 'simple' exposition of Mendelism," imagining "these funny creatures with faces and gestures."[13] In the writings of August Weismann[14] she ran across a definition of determinants as "'controlling' vital units" key to the germ-plasm theory with biophors being the "ultimate living units."[15] Friends noted her interests. As her contemporary the French writer Paul Bourget remarked, "Though like all the others she gets her gowns from the best houses of the Rue de la Paix, there is not a book of Darwin, Huxley, Spencer, Renan, Taine, which she has not studied."[16] Wharton educated herself out of a "geocentric" cosmology to arrive at a modern, scientific perspective unwilling to separate humankind's cultural expression from biological processes; in the fictions of the period I examine here, she repeatedly asserts, as she writes in an essay, that the "tendency of all growth, animal, human, social, is towards an ever-increasing complexity."[17]

In *French Ways and Their Meaning* (1919), Wharton maintains that "we should cultivate the sense of continuity, that 'sense of the past' which enriches the present and binds us up with the world's great stabilizing traditions of art and poetry and knowledge."[18] When one examines the properties of the relation between past and present depicted in her writing, features of what Judith Saunders remarks is Wharton's "tendency to consider the human condition from a biosocial point of view"[19] become evident. The trope of time's passage yielding outcomes valuable or destructive to individual and group in Wharton's fiction expands the application of biological concepts; cultures progress and useless features fall away along lines described by Wharton's Victorian scientists and their early twentieth-century inheritors, such as Weismann, Kellogg, and Lock. Ellen Olenska demonstrates this transformation in *The Age of Innocence* as she examines a case of artifacts at the new Metropolitan Museum, opened in 1870, commenting on "these little things, that used to be necessary and important to forgotten people, and now have to be guessed at under a magnifying glass and labelled: 'Use unknown.'"[20]

It is not just material culture that concerns the author though. In *The Fruit of the Tree*, Wharton considers the genesis of ethical principles, which, she suggests, emerge from something like gene-culture coevolution, delivering to the present "the universal consensus—the result of the world's accumulated experience."[21] It is a configuration of evolution and ethical principles that associates the passage of time and evolutionary processes with a vision of evolution operating not blindly but with agency. "Consensus" will produce the best result for the species. Herbert Gintis offers an accessible definition of gene-culture coevolution that is useful here: "Because culture is both constrained and promoted by the human genome, human cognitive, affective and moral capacities are the product of an evolutionary dynamic involving the interaction between genes and culture."[22] This idea in a basic form appears frequently in Wharton's fiction, modulated by the author's understanding of inheritance, one indebted to both Lamarck and Mendel. May Welland

in *The Age of Innocence* offers "the answers that instinct and tradition taught her to make,"[23] indicating the inextricability of biology and culture. Accumulation is a key term in this interactive process, implying trial, error, and, perhaps, propitious outcome in overlapping spheres of natural and cultural selection where the environment determines what will thrive or wither away. Biologically operant selection and descent do not present mere metaphorical possibilities for the fiction writer who suggests affinities between humans and nonhuman organisms. Instead, selection and descent are the implicit substrate for culture, the elements of which are inseparable from an ancient human nature at odds with changes in Progressive-era America.

CONTESTED THEORY AND THE CONTOURS OF WHARTON'S REALISM

Comprehending Wharton's application of Darwinism to cultural change in her fiction requires understanding concepts that focalize the interactions between characters and a culture presented as environment. Kellogg's *Darwinism Today* (1907) helped Wharton to link cultural tradition and "the law of variability" to create a biosocial context within which characters act. Among the riches in Kellogg's book, which includes a focus on genetics that helped to form Wharton's understanding of heredity and variability, is a summary of Ernst Haeckel's recapitulation theory, or biogenetic law, which was relevant to her portrayals of individual and social transformation: "The species recapitulates in the ontogeny (development) of each of its individuals the course or history of its phylogeny (descent or evolution). Hence the child corresponds in different periods of its development to the phyletic stages in the descent of man."[24] Bowler describes a progressive element in the recapitulation theory, finding that "the ascent of the human embryo through the classes was seen as a repetition of the historical development of life through geological time. This symbolized the universality of nature's plan and confirmed again that man was its central goal."[25]

In addition to studying recapitulation theory in Kellogg's book, Wharton worked through Haeckel's *History of Creation*. The subtitle, "A Popular Exposition of the Doctrine of Evolution in General and That of Darwin, Goethe, and Lamarck in Particular," indicates its accessibility, and the focus on these particular names explains its appeal. Wharton was articulating a self-truth as much as describing one of her intellectual heroes when she wrote, "Goethe the poet was nourished, not stunted, by the scientific inductions of Goethe the morphologist."[26] She praised what was for her a model of combinatory imaginativeness drawing on multiple disciplines. Haeckel's volume mixes poetry with science. Opening with a passage from William Wordsworth's *Tintern Abbey*, he finds a purposive energy that animates natural processes:

> A sense sublime
> Of something far more deeply interfused,
> Whose dwelling is the light of setting suns,
> And the round ocean, and the living air,
> And the blue sky, and in the mind of man;
> A motion and a spirit that impels
> All thinking things, all objects of all thought,
> And rolls through all things.[27]

The poem describes nature's inner logic, a nature whose perfection results from a "spirit that impels" processes acting through time. This spirit is "sublime" perfection, uniting nature and mind, and recapitulation is a physical manifestation of spiritual process and progress.

Wharton was particularly interested in Haeckel's validation of intertwined Darwinian and Lamarckian ideas in the first volume of his *History*. Hermione Lee observes that Wharton "marks a passage on two kinds of transmission, of inherited and of acquired characteristics. 'Individuals can transmit, not only those qualities which they themselves have inherited from their ancestors, but also the peculiar, individual qualities which they have acquired during their own life.'"[28] The first sentence of Haeckel's second volume points back to Darwin, acknowledging "the revolutionary influence which the Theory of Descent must exercise upon all sciences."[29] Haeckel goes on to define the recapitulation theory, or biogenetic law:

> By far the most important of these . . . records of creation is . . . ontogeny, that is, the history of the development of the organic individual. . . . It briefly repeats in great and marked features the series of forms which the ancestors of the respective individuals have passed through from the beginning of their tribe. We have designated the paleontological history of the development of the ancestors of a living form as the history of a tribe, or phylogeny. . . . "Ontogeny is a short and quick repetition, or recapitulation, of Phylogeny, determined by the laws of inheritance and adaptation."[30]

Drawing an analogy that takes the Copernican system of the universe explained by Newton's theory of gravitation as one term, Haeckel writes, "we see Lamarck's theory of descent attain its causal establishment by Darwin's theory of selection."[31] This suggests that selection, a theory whose significance is equated to Newton's, operates on acquired traits.

Haeckel writes that every animal "from the beginning of its individual existence passes through a series of different forms, and thus indicates in rapid succession and in general outlines the long and slowly changing series of states of forms which its progenitors have passed through."[32] Just as significant, Haeckel addresses definitions of progress and at one point describes "the supernatural hypotheses of creation, which . . . is called the twofold or dualistic, often the teleological or

vital, because it traces the organic natural phenomena to final causes, acting and working for a definite purpose."[33] Wharton did not eliminate teleology from her depictions of biosocial change. She shows evolution both as goal-directed and as increased complexity without progress, creating tension in narratives that illustrate a contested Darwinism.[34] Alternatively, Darwin provides to Theodore Dreiser in *Sister Carrie* "the consolation of knowing that evolution is ever in action, that the ideal is a light that cannot fail."[35] But Lily Bart's transformation in *The House of Mirth* leads not from an embryonic state to a birth that illustrates the historic development and progress of the species. Rather, she moves from her position as a beautiful woman, bred to marry a rich man, to first social and then physical extinction. Her demise in an environment unsuited to her own developmental needs recapitulates a phylogenetic end point at odds with the new, rapidly transforming world. Lily's "fate"—an often-used word in the novel that blends romantic destiny and literary-scientific dramatization—is an outcome of determinism, of the way that Lily's "civilization . . . had produced her"[36] and then, in turn, evolved itself, becoming an environment no longer supportive of her most highly developed traits. This is one case of Wharton's realism working less in the mode of pessimistic determinism evident in the work of Stephen Crane than in the context of dynamic (yet indeterminate) transmissions of inherited and acquired characteristics set against a transformed selection environment. A further example of Wharton's dramatization of Haeckel's theory that eschews his progressive outlook is *The Custom of the Country*'s Undine Spragg. She is a "dominant figure"[37] whose recapitulation of historical development at the individual level is arrested and regressive. She emblematizes the "promiscuity and incoherence" of a new society displacing one of "continuity and choice."[38] Evidently serving as one element of Wharton's biosocial perspective, Haeckel's phylogeny of development proved extensible to her interest in portraits of the ontogenetic development of individuals who exhibit micro-histories of political and class transformation.

Gillian Beer considers "the blurring of the distinction between ontogeny—individual development—and phylogeny—species development—in the single term 'evolution' . . . to be one of the most fruitful disturbances of [its] meaning"[39] for literature. Wharton's informed use of ontogeny and phylogeny as core concepts in the demonstration that culture is not autonomous from biology exemplifies one use of that "blurring." However, as Towheed has concluded, writers engaging with evolutionary matters are more than receivers in "a unidirectional flow of ideas from experimental science to the social sciences and literature."[40] Wharton was following George Eliot in actively propagating evolutionary ideas. She defended Eliot against the charge that she "was too 'scientific,'"[41] which was leveled by Henry James against *Middlemarch*. In an 1883 review in *Galaxy* he concluded that Eliot worked too hard "to recommend herself to a scientific audience . . . [and was] too often an echo of Messrs. Darwin and Huxley."[42] Charles Darwin may

have "ranked foremost among my Awakeners,"[43] as Wharton wrote, but Haeckel's romantic progressivism, though potentially troubling to one who grasped the stochastic element of Darwinism, shaped her vision of biosociality. The disturbance of evolution's already alarming meaning by recapitulation facilitated the focus on character development as a microcosm of the "phyletic stages" of national cultural descent and offered a specific mechanism through which Wharton narrates a biosocial vision.

Wharton's additional contact with Haeckel's ideas came through August Weismann's *The Evolution Theory*, which addresses pre-Darwinian theories of evolution. Weismann discusses Goethe and the rupture between Geoffroy Saint-Hilaire and Cuvier, the former two figures named in "The Angel at the Grave," and asserts that the "doctrine of descent has gained the day. . . . Evolution theory has become a permanent possession of science. . . . It forms the foundation of all our theories of the organic world, and all further progress must start from this basis."[44] Wharton recasts the doctrine of descent as late as 1920 when Newland Archer in *The Age of Innocence* regrets the "stupid law of change,"[45] a dynamic natural phenomenon disruptive to the stasis of aesthetic perfection Archer values. Weismann, a supporter of recapitulation,[46] finds that "the development of an individual animal follows, in a general way, the same course as the racial evolution of the species, so that structures of the ancestors of a species, even if they are not found in the fully developed animal, may occur in one of its earlier embryonic stages."[47] The presence of the recapitulation theory in so many of the primary texts read by Wharton illustrates Richards's statement that it "dominated biological research for fifty years, serving as a research tool that joined new areas into a common field for the application of evolutionary theory."[48] It was certainly adaptable to Wharton's drive to ameliorate, as she expressed in a letter, the "cursed assumption of the split between body and soul" that "Christianity has left in our blood," a statement claiming an interpenetration of genes and culture.[49]

Wharton's autobiography, *A Backward Glance* (1934), signals her concern with cultural selection through time. One passage illustrates the "hereditary vectors" Sharon Kim identifies as an authorial concern.[50] Wharton writes, "The value of duration is slowly asserting itself against the welter of change, . . . the traditions of three centuries have contributed to the moral wealth of our country."[51] Moral wealth exists in the present as an outcome of accumulation. It is a metaphor with evolutionary science as its ground. Tradition is the outcome of a selection process and the "welter of change" is a mutable environment. "Moral wealth" is a tangible, developed feature related to Darwin's sense that "man is descended from some less highly organized form."[52] Such wealth, though, has about it the ring of something desired and achieved in Wharton's narratives. This raises the issue of her assessment of Lamarckian inheritance of acquired characteristics and its appeal, as Kim describes it, as "something crucial: a link between science and her most cherished

belief," which she described as "continuity, that 'sense of the past.'"[53] Darwin validated an important premise of Lamarck's work, writing that he "upholds the doctrine that species, including man, are descended from other species. He first did the eminent service of arousing attention to the probability of all change in the organic, as well as in the inorganic world, being the result of law, and not of miraculous interposition."[54] The significance of continuity for Wharton includes the reality of renewal and progress as material processes.

Wharton advances the idea, then, that biology and cultural forms are subject to competition and selection for fitness. She illustrates selection environments being continually reconfigured by modern fluidity—in the breakdown of class boundaries exemplified by Simon Rosedale in *The House of Mirth*, Undine Spragg in *The Custom of the Country*, and Julius Beaufort in *The Age of Innocence*—and the sapping of authority from "stabilizing traditions" by a new socioeconomic elite, the drive for women's suffrage, a relaxation of divorce laws, the remaking of the United States through immigration, imperial aggression, industrialization, and urbanization. So her literary output was oriented toward a broad appeal and her political commentary was directed at, Jennie Kassanoff argues, "cultural containment."[55] But Wharton's efforts to criticize changes to a "real culture" she viewed as a stabilizing and particulate "impalpable dust of ideas"[56] arrived at through cultural selection are difficult to reconcile with evolutionary contingency, the logical enemy of a progressive cultural selection environment. Her commitment to refusing "to put faith in that which does not rest on sufficient evidence,"[57] a statement by T. H. Huxley she copied into a notebook, indicates a desire for objectivity. Wharton's Lamarckian view on cultural evolution (in terms of the possibility of moral aspirations and habits being inherited) and the coevolution of genes and culture in a goalless system are models she attempts carefully to validate, but these models are not wholly compatible. While it is true that Wharton "consistently posits an historical, biological, and cultural continuity that became a type of religion for her,"[58] this oversimplifies the authorial difficulties of imagining the interrelations of history, biology, and culture. Wharton depicts evolutionary contingency as a factor in those interrelations but finds what Cecilia Tichi describes as "a recent historical-evolutionary rupture"[59] to denature evolved tradition.

Darwin's *Descent of Man*—and its use of Lamarckism and what Bowler has identified as its "progressionist stance, implying that the white race and European culture represent the pinnacles of nature's advance"[60]—is one touchstone for a biosocial continuity inexorably in the process of working for what Haeckel describes as a "definite purpose." Wharton both endorses the view, as Darwin wrote to Charles Lyell in 1859, that "natural selection . . . implies no necessary tendency to progression"[61] and adapts Lamarckian principles that bring a progressivist philosophy into narratives of individual and cultural development. This possibility of cul-

tural progress toward some preordained ideal is at the center of "The Angel at the Grave." The story demonstrates an important element of Wharton's investment in the idea of a biological base for cultural progress: that is, such transformation necessarily leads to our true, nonspiritual understanding of its workings. "Angel" presents this in the context of Haeckel's theory of recapitulation.

DARWINIAN FICTIONS OF PROGRESS AND REVERSION

For a realist fiction writer, scientific theory plays out in characters' affective experiences and their interactions with the environment. "The Angel at the Grave" depicts a fusty American transcendentalist philosophy faded from public consciousness, and presents the rise of evolution as an alternative, decentering framework for understanding humans' place in the universe. The story opens with a description of a house once inhabited by a famous transcendentalist, Orestes Anson, whose memory is tended by his granddaughter Paulina Anson. She is a woman smothered by a sense of duty to her grandfather's work. "Born, as it were, into a museum, and cradled in a glass case with a label,"[62] Paulina is a specimen whose development doubles that of an intellectually maturing country. She seems at first a figure devoted to cultural memory and the inheritance of unchanging ideas, but "The Angel at the Grave" relates a shift in intellectual life away from spiritual explanations of the natural world to scientific ones.

As the story unfolds, the reader sees Anson's fame decline with the decades, and Paulina realizes she has sacrificed her happiness to duty. George Corby soon arrives, however. He is a young man representing the modern point of view; he seeks a key document that illustrates Orestes Anson's youthful scientific study. In "Angel," evolutionary investigations displace spirit and introduce chance and empiricism as features of a modern world. This happens in the context of Orestes Anson's study of the amphioxus, a small, fish-like creature Ernst Haeckel viewed as a transitional organism between invertebrates and vertebrates. Haeckel describes the amphioxus in a chapter of *The Evolution of Man* (1874) titled "Our Fish-Like Ancestors" and proposes that the organism was "the nearest relation to the ancestor of all the animals we know"[63] and a point of division in the evolution of life that would lead to humankind. He asserts that the amphioxus is important "not merely because it fills the deep gulf between the Invertebrates and Vertebrates, but also because it shows us to-day the typical vertebrate in all its simplicity. We owe to it the most important data that we proceed on in reconstructing the gradual historical development of the whole stem."[64] One significant element of Haeckel's thinking for Wharton, according to her biographer Lee, lay in his claim that "the fundamental idea, which must necessarily lie at the bottom of all natural theories of development is that of a gradual development of all (even the most perfect)

organisms out of a single, or out of a very few, quite simple and quite imperfect original beings, which come into existence, not by supernatural creation, but by spontaneous generation."[65]

In the story, the amphioxus is translated from a biological phenomenon into a symbol for a cultural turn; the amphioxus marks an important step in the progression toward humankind, yet it is also an emblem of a dynamic cultural process with its own eruptions of "spontaneous generation." Paulina recognizes something like this when she questions why her grandfather's doctrines faded so rapidly; she realizes that "the main current of thought had set another way" (263). The amphioxus is a scientific discovery that in "Angel" illuminates the diminishment of natural theology in a contest for authority with materialism. From one perspective, it is the story of a young woman who sacrifices her youth and opportunity to marry to further her grandfather's legacy. It also depicts an evolutionary transition in American culture represented by the freeing of Paulina from her grandfather's ideas. Initially beholden to a male-gendered intellectual legacy, her development mirrors an idealized transition of the United States from a country devoted to naïve spiritualism to one scientific and somewhat more supportive of gender equality.

Orestes Anson was known for his work on "free-will and intuition" (160). Reduced to being merely "the friend of Emerson" and "the correspondent of Hawthorne" (162) after his death and a decline in reputation, he undertook diverse investigations in his lifetime, a fact on which the story turns. Anson's name calls to mind that of Orestes Brownson (1803–76), a participant in the Transcendentalist Club, which first met in 1836 and "provided Emerson and his friends with an alternative to the Unitarianism and empiricism they were trying to find a way to renounce."[66] Wharton's naming of her character links empiricism with the transcendentalism that preceded it, but the naming also reverses history, for the fictional Orestes pursued science in his youth. Anson "achieved one of those anticipated immortalities not uncommon at a time when people were apt to base their literary judgments on their emotions" (255). Paulina, a young woman of exceptional intelligence (256), doesn't understand the muddled abstractions of her grandfather's writings, however. She instead finds herself drawn to "other centres of sensation, her vague intuition of heliocentric systems" (257). These systems displace humankind from the center much like Wharton's own release from a "geocentric universe," drawing in the Copernican revolution with which Darwin's ideas are linked. Paulina spends years writing a biography of her grandfather, but the son of the publisher who commissioned it refuses to take it. Paulina's reaction to both her grandfather's failure and her own hints at something new to come: "It was the sense of wasted labor that oppressed her; of two lives consumed in that ruthless process that uses generations of effort to build a single cell" (264).

In crafting this narrative of decline and rebirth, Wharton focuses on a distinctly American moment of evolution; she charts the descent of transcendentalism and

the ascent of scientific materialism. Anson's mature philosophy offers an inadequate understanding of humanity. Wharton elsewhere refers to transcendentalism as "a reverence for the unintelligible"[67] despite her great respect for Walt Whitman and Ralph Waldo Emerson. George Corby, then, represents post-transcendental thought when he arrives to see the house of the eminent man; Corby has "got on the trail through some old book on Brook Farm" (266; hinting at Anson's Hawthorne-like utopian interests) and is doing research for an article on him. Paulina takes Corby to be a pilgrim of the old kind, "a survivor of the days when such a visit was a part of the young enthusiast's itinerary" (265). Her heart beats faster when Corby states of Orestes Anson that "he's simply the greatest . . . the most phenomenal figure we've got" (266), and she assumes it is Anson's transcendentalist philosophy Corby praises.

However, it is Dr. Anson's lost pamphlet, "his account of the amphioxus" (267), that has compelled Corby to seek out Paulina. "I came across it by the merest accident myself, in a letter of vindication that he wrote in 1830 to an old scientific paper" (ibid.). He reports that in the 1820s Anson "must have been at least ten or twelve years ahead of Yarrell" (ibid.), and this reference brings William Yarrell (1784–1856) and his *History of British Fishes* (1836)—which Darwin refers to in *The Descent of Man*[68]—into the story's address of the emerging authority of science during the first half of the nineteenth century. Corby continues, "As I understand it, he actually anticipated in his pamphlet Saint Hilaire's theory of the universal type, and supported the hypothesis by describing the notochord of the amphioxus as a cartilaginous vertebral column. The specialists of the day jeered at him, of course, as the specialists in Goethe's time jeered at the plant-metamorphosis. As far as I can make out, the anatomists and zoologists were down on Dr. Anson to a man. . . . But the pamphlet must be here somewhere—he writes as though, in his first disappointment, he had destroyed the whole edition; but surely there must be at least one copy left?" (267). Corby's "scientific jargon" prompts Paulina to recall "the *amphioxus*. . . . It's an animal, isn't it—a fish?" (ibid.), and she recollects that "Orestes's title of 'Doctor'" was the result of having "studied medicine in his youth [when] . . . he had passed through a brief phase of anatomical ardor before his attention was diverted to super-sensual problems" (267–68). For Corby, "The pamphlet—the one thing that counts, that survives, that makes him what he is" marks the diminished influence of the "super-sensual" and the rise of the scientific. The story ends with Paulina promising to help Corby with her grandfather's papers. Now fully engaged, "she looked as though youth had touched on her lips" (270) as she anticipates the application of her intellect to questions that can be answered empirically. In Paulina's individual development (ontogeny) into a natural scientist, she recapitulates a history of cultural descent from superstition to science.

Wharton's story "The Descent of Man" appeared in the collection of the same

name in 1904. It plays on the meaning of Darwinian descent; here, instead of descent with modification from an ancestor, such as the amphioxus, resulting in complexity, descent connotes a craze for simplified and popularized science and an increase in the authority of "a pseudo-science masquerading in the garb of the real divinity" (349–50). In "The Vice of Reading" Wharton criticizes those readers who, unlike her, turned to "'popular' renderings of abstruse and difficult subjects: [such a reader] by confounding the hastiest réchauffé of scientific truisms with the slowly-matured conceptions of the original thinker . . . retards [the] true culture" (104). Pseudoscience provokes the eminent biologist Professor Linyard in "The Descent of Man" to write a satire of popular scientific works. Of course, this satire becomes a bestseller. The reading public wants new age transcendence rather than real science, which angers Linyard, who is more interested in the Lamarckian "war over the transmission of acquired characteristics" (395). The story's publication date matches that of Weismann's dismissal of Lamarck in *The Evolution Theory*, but Linyard's struggle, like Wharton's, is devoted to untangling competing theories. Darwin is not at the forefront of public conversation about science. Instead, a popular, simplified version of Spencerian and Lamarckian social evolution as a goal-directed process is the subject of Linyard's satire.

When the publisher Ned Harviss says of Linyard's misconstrued attack on popular science, "Why, you fit in everywhere—science, theology, natural history—and then the all-for-the-best element which is so popular just now" (406), Linyard finds that what he has intended as satire has been received as sincere. The "all-for-the-best element" replaces Darwinian contingency with directed progress, and Linyard studies the contested verity of Lamarck's ideas at a time when it is commonplace to see the social world through the lens of neo-Lamarckian ideas. This was a moment when "in America, [the neo-Lamarckian] Alpheus Packard supported use inheritance on the bases of entomology and a study of cave inhabiting blindfish, whose loss of eyesight he attributed to disuse,"[69] a direct reference to which occurs in Wharton's *Age of Innocence*. In the novel, Newland Archer, anticipating potential difficulties in educating his fiancée, May Welland, "shivered a little, remembering some of the new ideas in his scientific books, and the much-cited instance of the Kentucky cave-fish, which had ceased to develop eyes because they had no use for them" (82). Welland, Archer observes, refuses to acknowledge the possibility of change in a hermetic society that produces only "sameness—sameness" (83). If this is a Lamarckism that, Gillian Beer writes, "proposes a world of intelligent desire rationally satisfied,"[70] Wharton redirects it to depict an inheritance of blindness and social stasis in both *The Age of Innocence* and "The Descent of Man," the latter of which ends discouragingly when Linyard, made rich by what turns into a string of successful volumes exploiting the popularity of theologically tinged popular science, is unable to return to his real work. Even more detailed presentations of Wharton's biosocial themes can be found in her novels.

In Wharton's *House of Mirth* and *Custom of the Country*, what formerly would have been seen exclusively as characteristics of human culture are functions of adaptation. Each novel, however, demonstrates deviation from the standard that Darwin articulates in his 1876 revision of *The Descent of Man*. There he contends that "man has risen, though by slow and interrupted steps, from a lowly condition to the highest standard as yet attained by him in knowledge, morals and religion."[71] One notable element of these novels, which weave together heredity and evolutionary theory with narratives of human characters, is an implicit position on the entanglement of genes and culture in regard to this "highest standard." Each novel illustrates a broad, regressive transition in American intellectual, political, and economic life. Wharton fictionalizes a modern reversal of Darwin's view in *The Descent of Man* that "at the present day civilised nations are everywhere supplanting barbarous nations . . . and they succeed mainly, though not exclusively, through their arts, which are the products of the intellect. It is, therefore, highly probable that with mankind the intellectual faculties have been mainly and gradually perfected through natural selection."[72] Wharton merges descent with the notion of phyletic stages, diverting it for depictions of the progress of American culture. Referring to species, Kellogg wrote, phyletic stages exhibit "the course or history of [their] . . . descent or evolution."[73] Now the process that creates perfection is disrupted by modern conditions.

Lily Bart's environment in *The House of Mirth* and Undine Spragg's atavistic character in *The Custom of the Country* exhibit modes of inheritance indebted to Haeckel and Lamarck (and Lamarck's interpreters) nested in the master metaphor of Darwinian selection. The warrant for "the political doctrines of individualism and laissez-faire"[74] that Wharton encountered in the work of Spencer and his interpreters undergirds the fictions of individuals, as Claire Preston writes, pinned like specimens by the "macro-social structure [presented] as 'a selection environment.'"[75] Interactions between the individual and this environment present ethical challenges that goal-directed evolutionism might eventually resolve. Wharton depicts acquiescence to Herbert Spencer's infamous law of the "survival of the fittest: [a process in which] natural selection has been in operation at the outset, and can never cease to operate."[76] She follows him insofar as he finds "civilization . . . a part of nature; all of a piece with the development of the embryo or the unfolding of a flower."[77] Wharton, who indicated in a letter that Spencer was one of her greatest influences,[78] accepted the insight, though not all of its implications. She resisted, as did T. H. Huxley, the notion of fitness as self-justifying, and her criticism in the novels charts the destruction of the best that time and selection have delivered.

Thus, *The House of Mirth*'s Lily Bart possesses formerly useful but now nonadaptive traits that result in abjection and death. She wants her freedom from the obligation to marry, but she is bred to marry a rich man. Her lack of success baffles her. She tells the plain but self-sufficient Gerty Farish, a cousin of Lawrence

Selden—the man she loves but cannot marry—that "the beginning was in my cradle, I suppose, in the way I was brought up, and the things I was taught to care for. . . . I'll say it was in my blood" (226). Culture and body are not distinguished. What is in the blood is the capacity for Mendel's genes or Weismann's germ plasm—"units called 'determinants,' each responsible for producing a certain part of the body"[79]—to ultimately express habit, opinion, custom, culture. What is lacking in Lily's world is what in Darwin's *Descent of Man* is termed "sympathy, which it can hardly be doubted was originally developed through natural selection as one of the most important elements of the social instincts."[80] The "blind motions of her mating instinct" (319) compel Lily to transcend her circumstances as a pretty thing looking for a good socioeconomic match. She wants to move "Beyond!" (154) determination by an environmental shift from an "older society" (65) that has resulted in one "very much changed" (123) and marry for love. But she cannot. Driven by an ideal of personal freedom at odds with a changed America where the garden that supported her type has vanished, she is unsupported in a social world cast by Wharton as a dangerous environment wherein Lily is just an "organism" (301). A creature constituted by a "slowly-accumulated past [that] lives in the blood" (319), she is at odds with the same modern conditions that favor *The Custom of the Country*'s Undine Spragg. Undine is a primitively aggressive antiheroine, elevated to viability in a developing laissez-faire world that places no limits on her atavistic appetites. Of Lily, Wharton writes, "because a blue-bottle bangs irrationally against a window-pane, the drawing room naturalist may forget that under less artificial conditions it is capable of measuring distances and drawing conclusions with all the accuracy needful of its welfare" (115). Like the trapped fly, Lily's urge to escape her fate leads to death. It is, however, the idea that her environment is "artificial" that lends her behavior an element of rationality and exhibits the outpacing of genetic by cultural evolution as an element of Wharton's valuation of continuity.

Discussing Wharton's novel *The Children* (1928), Judith Saunders convincingly argues, "Wharton indicates that the rapid pace of cultural change ('all these new ways') is largely responsible for behavior deleterious to fitness. . . . Thus she presents the problem in terms understandable from an adaptationist perspective, as a by-product of the steadily increasing gap between genetic and cultural evolution."[81] Saunders points to Edward O. Wilson's claim that "the tempo of cultural evolution quickened"[82] some forty thousand to ten thousand years ago to pinpoint a historically recent alteration to gene-culture coevolution. A rift between an adapted state and rapidly changing environments exists in *The House of Mirth*. Sharon Kim's analysis of Lamarckism in the novel frames this by suggesting that "Wharton's characterization of Lily presents a Lamarckian configuration of self in relation to culture. . . . Through Lily, Wharton criticizes the hereditary vectors of this society: its disjunction from its inherited past."[83] The gap between genetic

and cultural evolution leaves Wharton's formerly adapted, organism-like characters exposed to environmental change, but Wharton's narratives reiterate competing views of the meaning of change. Selden finds Lily's behavior arising from a "carefully-elaborated plan. In judging Miss Bart, he had always made use of the 'argument from design'" (6), seeing purpose in her behavior, whereas the narrative frame finds her to be "mere spindrift of the whirling surface of existence" (319). Lily exemplifies Wharton's drive to fictionalize what she referred to as the "law of variability." If co-evolved, "artificial conditions" suggest that adverse effects result from a state of genetic and cultural evolution out of step. The narrative handling of the matter suggests that, despite the value of traditional culture to Wharton, its encoding of long-evolved "old-established distinctions" allows no cultural space for individual female choice.

The Custom of the Country, in contrast to the story of Lily Bart, depicts Undine Spragg as a different type of "organism" (64). Undine comes from new money. Her family's economic wealth and lack of connections to traditional culture contribute to a "new environment" (27) within the American social landscape, where the endogamous old guard "of the same blood and . . . the same traditions" (195) is labeled, in the case of Undine's husband, Ralph Marvell, "Homo Sapiens Americanus" (188) and dies out in the contest with the "pioneer blood" (64) of the "primitive" Undine (470). The novel finds natural selection operant in the context of a new class formation, adapted to a changed environment, betokening the end of an old guard compared to "those vanishing denizens of the American continent doomed to rapid extinction with the advance of the invading race" (78). Ralph is one such, an aristocratic aesthete poorly adapted to a modern breach of contiguous genetic and cultural evolution.

Wharton's understanding of selection, recapitulation, and Lamarckism permeates the novel. One minor character, a "sociologist" named Charles Bowen, frequently observes human nature with the same objectivity displayed by the narrator. Biological and social selves merge as products of a Lamarckian "continuity and choice" (243, 249). Bowen and Ralph Marvell "are of the same blood, . . . the same traditions" (195). Marvell feels that the inability to transcend this co-evolved blood and tradition is a "hidden hereditary failing" (378), but he cannot transcend the "generations" (ibid.) that have made him. The "chaos" (78) brought by a successful new species "evoked out of promiscuity and incoherence while the other had been the product of continuity and choice" (243) resonates with Darwinian narratives of Malthusian struggle, where "savages, when hard pressed, encroach on each other's territories."[84] Undine Spragg's destructive progress in *The Custom of the Country* depicts an American ethos wed to the "Wall Street code" (233). Inexpressive of a democratic genetic content of the somatic body politic, Undine disrupts the possibility of national regeneration as democratic or even inclusive by her domination of existing types, such as her husband, Ralph Marvell. She repre-

sents an earlier phylogenetic state of evolution that manifests the encoded, genetic cultural matter of an aggressive "primitive" (470) type reappearing in the present. As an atavistic occurrence, she "expresses this tendency to revert to the ancestral type," as Huxley wrote about the phenomenon in 1863.[85] Thought of in an evolutionary framework, impermanent races, like the elite "Aborigines" destined to vanish because of pressure by "the invading race" of the new socioeconomic elite in *The Custom of the Country* (77), or like the actual aboriginal peoples of North America, imply instability in social categories like class or in the supposed biological category of race.

CULTURAL CONTINUITY IN THE DARWINIAN CONTEXT

In the late essay "Tendencies in Modern Fiction" (1934), Wharton looked back in literary history to recall a moment when writers had "noticed the impact of surrounding circumstances on every individual life, . . . the religious and atmospheric influences, and those subtler differences produced by the then scarcely apprehended law of variability."[86] Here, "circumstances" are coextensive with selection environments. Religion is part of the matrix of "human relations . . . a tangled and deep rooted growth, a dark forest" hostile to the "idealist," as she wrote in *The Fruit of the Tree*.[87] The possibility that a progressivist stance can withstand scrutiny from the perspective of Darwinian contingency withers as the passage reminds readers of the "entangled bank, clothed with many plants of many kinds . . . produced by laws acting around us"[88] in the last paragraph of Darwin's *Origin*. Wharton's beloved tradition is "deep rooted" in time and inaccessibly ancient in origin but for processes such as variation and selection, theorized in *On the Origin of Species* and *The Descent of Man*. The latter famously insists in its final paragraph, "We must . . . acknowledge, as it seems to me, that man with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men but to the humblest living creature, with his God-like intellect . . . —with all these exalted powers—Man still bears in his bodily frame the indelible stamp of his lowly origin."[89] But in writing of Darwinism as hostile to the idealist, Wharton cuts against the grain of progressivism in the twentieth century and also against her own support of the "moral wealth of our country" as arrived at through a selection process that might enable the fruition of a desired political order.

For Wharton in *The Writing of Fiction*, the stamp of "lowly origin" resonates with her appreciation of the French realist Honoré de Balzac, "the first . . . to draw his dramatic action . . . from the relation of his characters to their . . . inherited habits and opinions."[90] Guided by Darwin's *Descent of Man*, Wharton searches for explanatory laws beyond class-based notions of "lowly origin" so as to understand intellect, sympathy, and benevolence as parts of a common evolved inheritance: as

Darwin explained it, "the first foundation or origin of the moral sense lies in the social instincts, including sympathy; and these instincts no doubt were primarily gained, as in the case of the lower animals, through natural selection."[91] The principle of variability working in co-related biological and social environments through time bridges nature and culture. In the conflicted vision of the biosocial sphere shaped both by Wharton's political conservatism and the reimagining of her former "geocentric universe" through evolutionary biology, one might think it entirely true that, as George Levine contends, "the determining factors of how Darwin's theory was to be used were, finally, the particular political commitments of the interpreters, commitments only fragilely dependent on the science they invoked."[92]

Wharton applies Darwin's statement that "individual differences . . . afford materials for natural selection to accumulate"[93] to human lifeways to address a culture unable to shield the vulnerable from its excesses. From this flows one of her key subjects: class competition between an established old guard and a new socioeconomic elite and its consequences for individuals. Human character and social instincts are subject to natural selection in Wharton's fiction, but her dramatizations of natural laws at work in surprising contexts do not offer so clear an example of political commitments being only "fragilely dependent" on the science Wharton uses. Darwinism overwhelms Wharton's class-bound social conservatism and destabilizes those political commitments she appealed to Darwinism to support. Wharton's commitment to a progressive inner logic of cultural selection is honest enough with the facts, as she understands them, to be inclusive of chance as a deeply problematic element for her model of cultural inheritance.

In fictionalizing Darwin's statement in *On the Origin of Species* that "as natural selection works solely by and for the good of each being, all corporeal and mental environments will tend to progress towards perfection,"[94] she understands too the austere contingency at play in the processes of mutation and selection.[95] Though he was unsympathetic to arguments for design in nature, Darwin's personal views on the matter were complex, as evidenced both by his modifications in subsequent editions of *Origin* and by a letter to the Harvard botanist Asa Gray: "I cannot think that the world, as we see it, is the result of chance; & yet I cannot look at each separate thing as the result of design."[96] Tension in Wharton's Darwinian fictional mode between tradition and stasis, fluidity and change, arises from this element of Darwinism. It exists in Wharton's reworking of Lamarck's ideas and in the arguments of Haeckel, Weismann, and others that Wharton redirected toward apposing design and complexity without intent. Her regard for traditional culture honors its status as an evolved set of beliefs and predispositions. However, anxiety in the fiction over blurring class boundaries and American anti-intellectualism was complicated by her understanding that stasis in cultural evolution is as impossible as it is in biological evolution.

Wharton's responses to Progressive-era trends in the United States could exhibit a feeling of inaptness. The novels plot a disruption of an evolving Western cultural tradition causally related to these trends, certainly, but with its beginnings in a sensed quickening of cultural evolution. To Wharton, Europe and the United States represent the past and future in the biological terms of displacement. She affiliates herself with the former, writing of "the contrast between the old & the new, between the stored beauty & tradition & amenity over there & the crassness here. . . . We don't think or feel as Americans do, we are the wretched exotics produced in a European glass-house, the most . . . useless class on earth."[97] Wharton encountered in Lock's *Variation, Heredity and Evolution* a passage on useful and useless features affected by evolution. This insight became relevant to her perspective on change; her characterization of Lily Bart in *The House of Mirth*, a figure frequently associated with the "hothouse" (150); and the conversation between Newland Archer and Ellen Olenska at the Metropolitan Museum already described. Lock wrote, "The features of every part [of an organism] are aimed at some useful purpose; or if they are not, then they have been useful in former times and under different circumstances, and are now undergoing a process of gradual removal, because the individuals in which the useless structure is least developed will have the best chance of surviving."[98] The "glass-house" and the "hothouse" represent a set of obsolete traits once able to thrive in a vanished environment, now irrelevant and unsuccessful in a culture of "crassness," except as specially produced specimens. Wharton's notion of "stored beauty & tradition" is open to our conception of it as a repository of adaptations transmitted by a particulate cultural inheritance, imagined by her in terms of August Weismann's "germ plasm, a special hereditary substance."[99] Stored beauty is somewhat more than a metaphor. It is the preserved capital of gene-culture coevolution expressed in national cultural characteristics. While a character in *Hudson River Bracketed* (1929), ignorant of decades-old advances in evolutionary biology, responds to a mention of Mendel's law as a discontinuous "series of jumps in the dark" with "Gee! Who's Mendel? Another new novelist?,"[100] Mendel's description of genetic heredity and the readings of it in Lock, Kellogg, and others provided Wharton with material for representing fictionally the evolutionary transformation of custom. This circulation of Mendel's theory makes him, if not a novelist, a supplier of facts and a store of metaphors with which Wharton fictionally posits the coevolution of biology and culture.

Fiction has the capacity to draw together the "animal, human, social," as Wharton wrote, to narrate human cultural and biological coevolution. Influenced by progressive views of evolution and with a willingness to apply natural science to social subject matter, she endorses, as a fact, an evolved "result of the world's accumulated experience" that demands attention in a United States overrun, Wharton thought, by the new. For all the attention to biosocial heritage, she also focuses on causes rather than purposes in narratives influenced by Darwinism. In this, she

bridges literary realism and scientific perspectives on human nature. The chaos of relatively sudden and disruptive cultural transformation presented in the fictions examined here impacts the characters in favorable and unfavorable ways depending on their orientation to the cultural selection environment. Yet the competing strains of Darwinian ideas are just as surely an element of her fiction, upon which Wharton draws for her characterizations of individuals as organisms, or culture as a legacy of blood. Wharton's extension of Darwinism and its legacy to a reading of biology and human cultural systems as interrelated products of geological ages and selection does not, ultimately, reconcile progressivism, contingency, and cultural change. The intellectual arguments of the natural scientists she studied, though, are arrayed in her fiction to address the implications for thinking about progress they provoked.

NOTES

1. Bert Bender, *The Descent of Love: Darwin and the Theory of Sexual Selection in American Fiction, 1871–1926* (Philadelphia: University of Pennsylvania Press, 1996); Paul J. Ohler, *Edith Wharton's "Evolutionary Conception": Darwinian Allegory in the Major Novels* (New York: Routledge, 2006); Claire Preston, *Edith Wharton's Social Register* (New York: St. Martin's, 2000); Judith Saunders, *Reading Edith Wharton through a Darwinian Lens* (Jefferson, N.C.: McFarland, 2009); Cecilia Tichi, "Emerson, Darwin, and *The Custom of the Country*," in *A Historical Guide to Edith Wharton*, ed. Carol Singley (New York: Oxford University Press, 2003), 89–114; Shafquat Towheed, "The Creative Evolution of Scientific Paradigms: Vernon Lee and the Debate over the Hereditary Transmission of Acquired Characteristics," *Victorian Studies* 49, no. 2 (2006): 33–61.

2. Marsha L Richmond, "The 1909 Darwin Celebration: Reexamining Evolution in Light of Mendel, Mutation, and Meiosis," *Isis* 97, no. 3 (2006): 447–84, 448.

3. Tichi, "Emerson, Darwin, and *The Custom of the Country*," 90.

4. Edith Wharton, "The Great American Novel," in *The Uncollected Critical Writings of Edith Wharton*, ed. Frederick Wegener (Princeton, N.J.: Princeton University Press, 1996), 151–59, 155.

5. Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (1871; rpt., Princeton, N.J.: Princeton University Press, 1981), 178–79.

6. Charles Darwin to Alfred Russel Wallace, Dec. 22, 1867, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2192 (accessed July 15, 2012).

7. Bender, *Descent of Love*, 314.

8. Gillian Beer, *Open Fields: Science in Cultural Encounter* (Oxford: Oxford University Press, 1995), 1.

9. Edith Wharton, *A Backward Glance* (1934; rpt., New York: Library of America, 1990), 856.

10. Preston, *Edith Wharton's Social Register*, 56. Shafquat Towheed drew my attention to Wharton's reading of Weismann, and Hugo de Vries's *Plant Breeding* (1907) in his "Review of *Edith Wharton's Evolutionary Conception*," *Edith Wharton Review* 22, no. 1 (2006): 5–8.

11. Edith Wharton, *The Letters of Edith Wharton*, ed. R. W. B. Lewis and Nancy Lewis (New York: Collier, 1988), 146.

12. Wharton was reading the right books on evolutionary biology. For a contemporary assessment of Kellogg's *Darwinism Today*, see Stephen Jay Gould, *The Structure of Evolutionary Theory* (Cambridge, Mass.: Belknap, 2002), 163.

13. Wharton, *Letters*, 151.

14. George Ramsden, *Edith Wharton's Library* (Settrington, England: Stone Trough, 1999), 135. She owned the volume in the Thomsons' 1904 translation.

15. August Weismann, *The Evolution Theory*, trans. J. Arthur Thomson and Margaret R. Thomson (London: Edward Arnold, 1904), 1:viii, 345.

16. Paul Bourget, *Outre-mer: Impressions of America* (New York: Scribner's, 1895), 93.

17. Wharton, "The Great American Novel," 155.

18. Edith Wharton, *French Ways and Their Meaning* (New York: Appleton, 1919), 97.

19. Saunders, *Reading Edith Wharton*, 2.

20. Edith Wharton, *The Age of Innocence* (1920; rpt., New York: Collier, 1993), 310.

21. Edith Wharton, *The Fruit of the Tree* (New York: Scribner's, 1907), 418.

22. Herbert Gintis, "Gene-Culture Coevolution and the Nature of Human Society," *Philosophical Transactions of the Royal Society* 366 (Mar. 2011): 878–88, 878.

23. Wharton, *Age of Innocence*, 82.

24. Vernon Kellogg, *Darwinism Today: A Discussion of Present Day Scientific Criticism of the Darwinian Selection Theories* (New York: Holt, 1907), 21.

25. Peter J. Bowler, *Evolution: The History of an Idea*, rev. ed. (Berkeley: University of California Press, 1989), 127. Bowler's view of Haeckel is disputed. See Robert J. Richards, *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought* (Chicago: University of Chicago Press, 2008), 5.

26. Edith Wharton, "George Eliot," in Wegener, *Uncollected Critical Writings*, 71–78, 72.

27. Ernst von Haeckel, *The History of Creation*, 4th ed., trans. E. Ray Lankester (New York: Appleton, 1876), 1:ii.

28. Hermione Lee, *Edith Wharton* (London: Chatto and Windus, 2007), 70.

29. Haeckel, *History of Creation*, 2:1.

30. Ibid., 33.

31. Ibid., 264.

32. Ibid., 33.

33. Ibid., 1:75–76.

34. See Bowler, *Evolution*, 9.

35. Theodore Dreiser, *Sister Carrie* (1900; rpt., Garden City, N.Y.: Doubleday, 1997), 82.

36. Edith Wharton, *The House of Mirth* (1905; rpt., New York: Penguin, 1985), 7.

37. Edith Wharton, *The Custom of the Country* (1913; rpt., New York: Scribner's, 1997), 48.

38. Ibid., 243.

39. Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, 2nd ed. (Cambridge: Cambridge University Press, 2000), 12.

40. Towheed, "Creative Evolution of Scientific Paradigms," 34.

41. Wharton, "George Eliot," 71

42. Henry James, *Literary Criticism, Essays on Literature, American Writers, English Writ-*

ers, ed. Leon Edel with Mark Wilson (New York: Library of America, 1984), 965. Beer mentions the essay in *Darwin's Plots*, 139.

43. Wharton, *A Backward Glance*, 838.

44. Weismann, *The Evolution Theory*, 2.

45. Wharton, *Age of Innocence*, 310.

46. Stephen Jay Gould, *Ontogeny and Phylogeny* (Cambridge, Mass.: Harvard University Press, 1977), 102.

47. Weismann, *The Evolution Theory*, 4.

48. Richards, *Tragic Sense of Life*, 4.

49. Wharton, *Letters*, 159.

50. Sharon Kim, "Lamarckism and the Study of Transcendence in *The House of Mirth*," *Studies in the Novel* 38, no. 2 (Summer 2006): 189.

51. Wharton, *A Backward Glance*, 780.

52. Darwin, *Descent*, 385.

53. Kim, "Lamarckism and the Study of Transcendence," 188.

54. Charles Darwin, *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life*, 3rd ed. (London: John Murray, 1861), xiii.

55. Jennie Kassanoff, *Edith Wharton and the Politics of Race* (Cambridge: Cambridge University Press, 2004), 7.

56. Wharton, "The Great American Novel," 156.

57. R. W. B Lewis, *Edith Wharton: A Biography* (1975; rpt., New York: Fromm, 1985), 230.

58. Kim, "Lamarckism and the Study of Transcendence," 194.

59. Tichi, "Emerson, Darwin, and *The Custom of the Country*," 90.

60. Peter J. Bowler, *The Non-Darwinian Revolution* (Baltimore, Md.: Johns Hopkins University Press, 1992), 145.

61. Charles Darwin to Charles Lyell, Oct. 11, 1859, Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2503 (accessed May 30, 2012).

62. Edith Wharton, "The Angel at the Grave,"in *Edith Wharton: Collected Stories, 1891–1910*, ed. Maureen Howard (New York: Library of America, 2001), 254–70, 254. All references to this source hereafter cited in the text.

63. Ernst Haeckel, *The Evolution of Man: A Popular Scientific Study* (1874; rpt., New York: Putnam's, 1905), 2:229.

64. Ibid.

65. Haeckel, *History of Creation*, 1:75.

66. Louis Menand, *The Metaphysical Club: A Story of Ideas in America* (New York: Farrar, Straus and Giroux, 2001), 248.

67. Edith Wharton, "The Vice of Reading," in Wegener, *Uncollected Critical Writings*, 99–106, 103.

68. Darwin, *Descent*, 359.

69. Bowler, *Evolution*, 246.

70. Beer, *Darwin's Plots*, 19.

71. Charles Darwin, *The Descent of Man and Selection in Relation to Sex*, rev. ed. (New York: Appleton, 1876), 143. The change to the language of the original 1871 edition (see 180) is one of compromise, for Darwin initially does not mention religion.

72. Darwin, *Descent*, 160.

73. Kellogg, *Darwinism Today*, 21.

74. Menand, *The Metaphysical Club*, 194–95.

75. Preston, *Edith Wharton's Social Register*, 55.

76. Herbert Spencer, *The Principles of Biology* (London: Williams and Norgate, 1864), 1:468.

77. Herbert Spencer, *Social Statics; or, The Conditions Essential to Happiness Specified, and the First of Them Developed* (1851; rpt., New York: Appleton, 1872), 31.

78. Wharton, *Letters*, 136.

79. Bowler, *Evolution*, 237.

80. Darwin, *Descent* (1876), 143.

81. Saunders, *Reading Edith Wharton*, 189.

82. Ibid., 189.

83. Kim, "Lamarckism and the Study of Transcendence," 189.

84. Ibid., 46.

85. Thomas Henry Huxley, "On Our Knowledge of the Causes of the Phenomena of Organic Nature," in his *Darwiniana: Essays* (1863; rpt., New York: Appleton, 1896), 303–475, 398.

86. Edith Wharton, "Tendencies in Modern Fiction" (1934), in Wegener, *Uncollected Critical Writings*, 170–74, 171.

87. Wharton, *Fruit of the Tree*, 624.

88. Darwin, *Origin*, 459.

89. Darwin, *Descent*, 405.

90. Edith Wharton, *The Writing of Fiction* (1925; rpt., New York: Simon and Schuster, 1997), 8.

91. Darwin, *Descent*, 394.

92. George Levine, *Darwin Loves You* (Princeton, N.J.: Princeton University Press, 2006), 96.

93. Darwin, *Origin,* 110.

94. Ibid., 459.

95. Janet Browne, *Charles Darwin: The Power of Place* (New York: Knopf, 2002). Browne's discussion of the publication of *On the Origin of Species* and subsequent events includes Darwin's "long journey of compromise," which saw him include in the second edition (Jan. 7, 1860) an epigraph that acknowledged, "God could work through scientific laws as effectively as through divine omnipotence" (96).

96. Qtd. ibid., 175.

97. Wharton, *Letters*, 84.

98. R. H. Lock, *Variation, Heredity and Evolution* (1906; rpt., London: John Murray, 1916), 51.

99. Weismann, *The Evolution Theory*, 1:vii.

100. Edith Wharton, *Hudson River Bracketed* (1929; rpt., New York: Scribner's, 1969), 371.

HEIKE SCHAEFER

"A World Which Is Not All In, and Never Will Be"

Darwinism, Pragmatist Thinking, and Modernist Poetry

The reception of Darwinism has proven to be a treasure trove for anyone interested in the dynamics of exchange between the natural sciences and literary culture. Darwinism not only instigated a paradigm shift in the natural sciences, but also has exerted a tremendous influence on the literary imagination since it began to migrate from its scientific habitat to other cultural areas. For the past 150 years, evolutionary theory has been claimed and rejected in the context of such diverse cultural projects as naturalism, Social Darwinism, pragmatism, creationism, and posthumanism. In the United States it continues to this day to be the subject of heated debates and legal battles. Many Americans still prefer creationist beliefs to Darwinian theory.

This essay traces some of the multifaceted philosophical and literary responses to evolutionary theory. I explore how U.S. writers in the late nineteenth century and the first half of the twentieth responded to Darwin's model of evolutionary change. My argument unfolds in the three stages indicated by the subtitle of the essay. First, I outline the cultural and religious significance that Darwin's contemporaries attributed to evolutionary theory. I briefly consider how naturalist and natural history writers at the turn of the century reacted to the dissolution of pre-Darwinian certainties. In the second step, I examine the pragmatist appropriation of Darwinism by the American philosopher John Dewey. Dewey drew on evolutionary logic to argue that such different cultures of knowledge as science, philosophy, and literature share a common purpose: they advance the development of human potential by expanding our capacity for reciprocal interactions with one another and our environment. To help us negotiate the demands of the situations we encounter, Dewey reasoned, our different ways of understanding have to converge in an experiential mode of knowledge that is at the same time specific, provisional, and relational. Such an integrative form of knowledge, he

insisted, would offer us the best possibility for individual development and help to transform American society into a participatory democracy. Dewey's experiential concept of scientific inquiry and aesthetic expression, then, provides the framework for my analysis of modernist poetry in the third part of this essay. I read the poetry of Wallace Stevens and William Carlos Williams through the lens of pragmatist evolutionary thinking to bring the processual and relational logic of their poems into focus. The poems foreground processes of perception and signification to explore how different modes of seeing and saying affect our capacity to participate in the world. They bear out Dewey's conviction that a fusion of the literary and scientific imagination carries the potential for cultural innovation. "Only imaginative vision," he reminds us in *Art as Experience* (1934), "elicits the possibilities that are interwoven within the texture of the actual."[1]

THE RECEPTION OF DARWINISM IN THE UNITED STATES

When Charles Darwin published *On the Origin of Species* in 1859 and *The Descent of Man* in 1871, he offered a scientific theory that profoundly changed how people thought not only about nature but about themselves and their place in the world. Darwin offered a systematic explanation about how life forms had evolved and continued to develop. He argued that speciation, the development of life into distinct species of increasingly complex organisms, had occurred and continued to occur and that the principle controlling these transformations was natural selection.[2] According to Darwin, life developed through adaptation and variation toward more complexity. He summarized his claim in the last sentence of *The Origin of Species*: "whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved."[3]

Darwin's assertion sounds rather innocuous. Why would such a statement cause major cultural debates? One reason that Darwin's theory scandalized the Victorian public was that it clashed with the Christian account of creation and the study of natural history in the tradition of natural theology.[4] Whereas earlier natural philosophers, such as William Paley, or even Darwin's contemporary Louis Agassiz, had studied the natural world in order to reveal its divine origin and order, Darwin claimed that evolution occurred independently of a divine groundplan. Rather than setting out to prove that the world was created once and for all by God, given and unchanging, Darwin suggested that variation happened randomly and that evolutionary change had no predetermined telos. When he broadened his argument in *The Descent of Man* and integrated humans into a unified system, into a single tree of life, his theory hit too close to home.[5]

For Darwin's nineteenth-century readers, evolutionary thought caused anxieties about the origin, character, and destiny of humanity. If the world was not created

and permanently structured by God and if humans did not enjoy a privileged position in a great chain of being, then who was in charge and what was the fate of humans? People were afraid that the natural world, once severed from its sacred foundation, was amoral, arbitrary, and cruel.[6] Since Darwinism demoted humans to being part of a changing natural order, it not only posed a challenge to religious belief systems but it also put pressure on secular conceptions of subjectivity, history, and culture. If people shared common ancestors with simians, they might share other characteristics too. Darwin's contemporaries feared that people would turn out to be brutes driven by base desires and material needs rather than by benign morals or enlightened ideals, or that they were doomed to fall prey to the impersonal and indifferent forces of their natural or social environments. For Darwin's early readers, his evolutionary model left little room for the belief in either salvation or the autonomy of a free-willing mind.

As literature is apt to do, it contributed and responded to this cultural upheaval. Authors took up the anxieties readily afloat in the dominant culture and examined the implications of the new worldview. A well-known case in point is the emergence of literary naturalism in Europe in the 1880s and in the United States in the 1890s. The fictional worlds of the naturalists are populated by characters determined by instinct, desire, and larger natural or cultural forces. In works like Stephen Crane's *Maggie: A Girl of the Streets* (1893), Theodore Dreiser's *Sister Carrie* (1900), and Frank Norris's *McTeague* (1899), the social environment, heredity, desire, and fate exert forces that cancel out the human capacity for self-determination and volition.[7]

While the fiction-writing naturalists frequently depicted human protagonists that seem overdetermined, sometimes to the point of resembling degraded animals, the authors writing natural history took just the opposite course and reimagined nature as a stable moral universe. They projected on the natural world Christian values and Victorian social norms. Hence we find texts like Ernest Thompson Seton's "The Natural History of the Ten Commandments" (1907), which argues that animal behavior is governed by biblical law, and William Long's *School of the Woods* (1903).[8] In this collection of stories, Long describes animals that educate their offspring in "interesting little wild kindergartens" and that act so nobly and wisely that they instill in human observers a desire "for some measure of their freedom, their strength of play, their joyfulness."[9] The stories highlight cooperation and knowledge rather than competition and instincts.[10] Not surprisingly, the soothing portraits of animal intelligence and morality were immensely popular.

In order to assuage fears about nature as an immoral and threatening force, the tales had to be passed off as scientifically accurate accounts. But when the authors claimed factual veracity, the very first American debate on the scientific standards of popular science writing erupted. This so-called nature faker debate was a mat-

ter of great public interest during the years 1903–1907. It involved such illustrious figures as John Burroughs, Jack London, and the president of the United States, Theodore Roosevelt, who demanded a ban on "deliberate or reckless untruth" in natural history writing.[11]

The nature faker controversy initiated a public debate about the extent to which the scientific, the religious, the moral, and the aesthetic imaginations could complement and augment or qualify and invalidate one another. This issue has continued to shape the U.S. reception of evolutionary theory well into the twenty-first century. Especially, the unease about the religious implications of Darwinism has persisted in certain segments of American society. Because evolutionary theory posits a world of continuous but random change without a first or final cause, it ruptures orthodox Christian belief and introduces a sense of existential uncertainty. Hence a majority of Americans continue to dismiss Darwinian evolutionary theory. In a 2012 nationwide poll, 46 percent of the respondents agreed that "God created human beings pretty much in their present form at one time within the last 10,000 years or so."[12] Another 32 percent of the interviewees opted for the assertion that evolution happens with God guiding the process. This compromise, which was embraced by Darwin's possibly most prominent early supporter, the American botanist Asa Gray, and which still represents the Vatican's position, was aptly characterized by John Dewey over a hundred years ago as an argument for "design on the installment plan."[13] Only 15 percent of the participants in the 2012 poll accepted the notion of evolutionary processes without qualification. The rejection of evolutionary theory is sufficiently widespread among Americans to inform educational policies. In response to the protests of creationists and "intelligent design" advocates, several states have considered either withdrawing evolution as a mandatory subject from the scientific curriculum of their high schools or adding material on creationism.[14] In "The State of State Science Standards 2012" the Fordham Institute notes that anti-evolution initiatives continue to undermine the quality of science education in the United States.[15]

In sum, evolutionary theory has been and continues to be embattled in American culture because it provides a scientific basis for arguments in favor of flexibility and change rather than essences and fixed design. Whether we listen to the arguments of the current creationists, ponder the fears of Darwin's contemporaries, visit the deterministic universes of the naturalists, or read the sentimentalized portraits of animal morality by the nature fakers, we find a common source of anxiety—the notion that we inhabit a world in flux, without final cause but shot through with contingency. The idea that we do not occupy a privileged position in this world but are subject to environmental influences and the evolutionary processes of adaptation, variation, and selection is perceived as a threat.

Yet this is only one way of responding to evolutionary theory. From our current, postmodern perspective, it seems hardly surprising that other thinkers and

writers would turn to Darwinism and regard its nonteleological model of a world in change as holding a liberatory promise. A case in point is the pragmatist appropriation of Darwinian evolutionary theory by John Dewey, who was born the very year that *On the Origin of Species* was published.

DEWEY'S PRAGMATIST APPROPRIATION OF EVOLUTIONARY THEORY

Dewey's pragmatist response to Darwinism is highly relevant to the purposes of this volume because Dewey applied the paradigm of evolutionary change to all fields of his philosophical inquiry—to questions of knowledge, ethics, politics, and aesthetics. Rather than think of science, philosophy, and the arts as generating incompatible kinds of knowledge, Dewey insisted on the convergence of their ways of understanding and describing the world. Hence his work offers us a sustained reflection on how the scientific, philosophical, and literary imaginations may meet.

As a philosopher, Dewey was primarily interested in the challenge that Darwinism posed as a "mode of thinking" to established ideas and methods of inquiry.[16] For Dewey, the major achievements of evolutionary theory were its foregrounding of change and interactive processes that unfolded in specific contexts and its refutation of stasis, essences, and "atomistic individualism."[17] As he sums up the cultural significance of Darwin's work in his essay "The Influence of Darwinism on Philosophy" (1909), which he wrote in honor of the fiftieth anniversary of the publication of *On the Origin of Species*: "In laying hands upon the sacred ark of absolute permanency, in treating the forms that had been regarded as types of fixity and perfection as originating and passing away, the 'Origin of Species' introduced a mode of thinking that in the end was bound to transform the logic of knowledge, and hence the treatment of morals, politics, and religion."[18] In the wake of evolutionary theory, Dewey maintains, philosophy has the responsibility to cease "inquiry after absolute origins and absolute finalities in order to explore specific values and the specific conditions that generate them."[19]

Dewey uses Darwinism, in other words, to lend scientific authority to his call for a general reorientation of philosophy in the direction of pragmatism. For what is at the core of pragmatism if not inquiry into "specific values and the specific conditions that generate them"? Pragmatism, after all, is mainly concerned with the concrete consequences that specific assumptions have in particular situations.[20] From a pragmatist perspective, ideas are valuable insofar as they inform and direct our actions, and it is only after we have acted, in hindsight, that we can assess their value. Hence, thinking processes are seen to function primarily to solve problems,[21] and knowledge serves as our "partial and incomplete" guide vis-à-vis "a future which cannot be known, but only speculated about and resolved upon."[22]

Put another way, instead of asking whether something is true in principle, pragmatists inquire into those decisions and actions that our knowledge inspires: "What new responsibilities does this knowledge impose? To what new adventures does it invite?"[23] In conceiving information and ideas as tools that help us navigate specific situations, that allow us to conjecture which behavior or attitude may yield the most beneficial results under the current albeit already changing conditions, Dewey stresses the pragmatic and the provisional, the relational and the transformative character of knowledge.

For Dewey, our contacts with the world around us—the changes that we initiate and live through as we interact with our surroundings—form the matrix of our thoughts. Rather than think of the intellect as an independent agent that acts in isolation from our ongoing corporeal engagement with specific situations, Dewey envisions cognition as an experiential process. "Mind is primarily a verb," he quips in *Art as Experience* to emphasize that consciousness is not an autonomous entity, as the noun would suggest, but a power and agency that unfolds in response to environing forces.[24] Taking up Darwin's argument that life forms ensure their survival and flourishing by adapting to circumstances, Dewey describes cognitive processes as adaptive responses to changing situations and settings. We gain knowledge experientially, he asserts, as we strive to align ourselves with a world that accommodates yet also resists us: "All deliberate action of mind is in a way an experiment with the world to see what it will stand for, what it will promote and what frustrate. The world is tolerant and fairly hospitable. It permits and even encourages all sorts of experiments. But in the long run some are more welcomed and assimilated than others."[25]

The shift in focus from the permanent to the provisional, from essence to process, from the general and abstract to the specific and situated, from thought to experience represents for Dewey not merely an epistemological position. Instead, it signals an attitude that possesses distinct social and political implications. As Dewey points out, to solve any problem at hand, we need to pay attention to the concrete and to muster the courage to test ceaselessly whether our ideas help us to respond adequately to the situations we encounter or whether the world defies us and we need to try a different course of action. In the wake of evolutionary theory, Dewey insists, our commitment needs to shift "from an intelligence that shaped things once and for all to the particular intelligences which things are even now shaping; shifts from an ultimate goal of good to the direct increments of justice and happiness that intelligent administration of existent conditions may beget and that present carelessness or stupidity will destroy or forego."[26] For Dewey, the search for absolutes indicates a desire to sidestep one's responsibility. It signals an attempt to shift the burden of problem solving to the "shoulders of the transcendent cause" and thus to evade being held accountable for one's decisions and

actions.[27] By contrast, to think of meaning as particular and conditional, as created within specific contexts and as grounded in individual experiences is to accept one's responsibility. It is an attitude that enhances one's ability to act purposefully and reciprocally.

Dewey thus promotes a pragmatist turn not only for the sake of rejuvenating philosophy as an academic discipline. Rather, he seeks to advance a larger cultural and political project: the restructuring of American society into a participatory democracy. What Darwin's first critics and today's creationists perceive as a horror, Dewey presents as the precondition of both individual liberty and egalitarian social relations. For him, a world that always remains incomplete, "a universe in which there is real uncertainty and contingency, a world which is not all in, and never will be," offers the possibility for fullest participation.[28] If we view the world as given and unchanging, Dewey reasons, we severely delimit our possibility to contribute in any meaningful ways to its order. But if we envision the world as continually emerging and evolving, we open up opportunities to participate in this ceaseless becoming, to direct change and to be transformed in the exchange.

In arguing for the formation of a genuinely democratic American society from a pragmatist position steeped in Darwinian thought, Dewey has to tackle the difficult task of employing evolutionary logic without translating cultural dynamics and politics back into biology. "Nature has no end, no aim, no purpose," he announces in "Ethics and Physical Science" (1887). "There is change only, not advance towards a goal."[29] Although Dewey is concerned with the ways in which biological necessities inform cultural practices and enable individual and collective development, he stresses that the adaptive responses of humans differ from those of other animals in that they have become conscious and intentional. In "Evolution and Ethics" (1898), he points out: "That which was unconscious adaptation and survival in the animal . . . is with man conscious deliberation and experimentation."[30] Unlike the Social Darwinists, Dewey does not view humans, social groups, or political entities as organisms that evolve under consistent natural laws. He does not believe in a kind of cultural or social heredity and a corresponding natural hierarchy of fitness among humans. He is not interested in presenting democracy as superior to other cultural or political systems because of an innate evolutionary trajectory.

When Dewey argues for the democratization of American culture on the basis of the philosophical implications of Darwinism, he gauges the relative merit of different forms of social and political organization in terms of their capacity to foster the flourishing of individual lives. He privileges democracy because he envisions it as the social environment that most fully allows people to experiment on the level of personal experience with different modes of individual development and communal interaction. In "Creative Democracy—The Task before Us" (1939), he

defines democracy accordingly as "the belief in the ability of human experience to generate the aims and methods by which further experience will grow in ordered richness."[31] Dewey appraises democracy as an ongoing social process that facilitates the constructive and cooperative unfolding of human potential. He is interested in democracy as an evolving "mode of associated living, of conjoint communicated experience" rather than as a form of government whose laws and institutions remain extraneous to the concerns and experiential processes of daily life.[32] The aim of democracy, he asserts, is the "creation of a freer and more humane experience in which all share and to which all contribute."[33]

For Dewey, one form of cultural practice that significantly enriches the quality of democracy as an individual and collective "way of life" is aesthetic experience.[34] Because art offers a deliberately focused and intensified form of experience, it may sharpen our awareness of the processes through which we continually and often routinely adjust to the world around us. Dewey elaborates the argument in *Art as Experience*, his work most specifically concerned with aesthetics: "Tangled scenes of life are made more intelligible in esthetic experience: not, however, as reflection and science render things more intelligible by reduction to conceptual form, but by presenting their meanings as the matter of a clarified, coherent, and intensified or 'impassioned' experience."[35] According to Dewey, art provides a medium through which one may reflect on previous experiences and explore yet unrealized options. In expanding the range of our imagination, emotions, and actions, aesthetic experience may augment our individual lives and facilitate the extension of our intersubjective relations. Since it allows us "to share vividly and deeply in meanings to which we had been dumb," it may help us overcome "barriers that divide human beings, which are impermeable in ordinary association."[36] While Dewey attributes this egalitarian impulse to all art forms, he considers it particularly pertinent for the cultural work that literature can perform due to its language-based communicative character.[37]

Applying evolutionary logic to the field of aesthetics, Dewey describes the production and reception of art, including the writing and reading of literary texts, as concentrated forms of experience that help us to continually readjust ourselves to our social and biophysical environments. Since aesthetic experience allows us to experiment with and to reflect on the processes through which we enter, absorb, and transform constantly changing situations, it deepens our engagement with the internal and external realities we generate and encounter. To the degree that art enhances our experiential knowledge of the world, Dewey contends, it helps us "to meet the impact of surrounding forces, to meet so as to endure and to persist, to extend or expand through undergoing the very forces that, apart from [our] response, are indifferent and hostile."[38]

To summarize, Dewey uses evolutionary thinking to redefine in pragmatist and

democratic terms the personal and communal functions of science, philosophy, and the arts. For Dewey, these different fields of inquiry, experience, and expression can be equally "useful in the ultimate degree" if they contribute "directly and liberally to an expanding and enriched life."[39] Convinced that the drifting apart of increasingly specialized ways of knowing interferes with the democratic rebuilding of American society and the development of human potential writ large, Dewey calls for an intensified exchange between science, philosophy, and aesthetics. In *Reconstruction in Philosophy* (1920), he asserts, "Surely there is no more significant question before the world than this question of the possibility and method of reconciliation of the attitudes of practical science and contemplative esthetic appreciation."[40] Dewey's work can be read, then, as an effort to create a synthesis of different forms of knowledge. By integrating evolutionary, pragmatist, democratic, and aesthetic thinking, Dewey's writing exemplifies and promotes the possibility that diverse modes of knowledge and signification can converge in culturally innovative and productive ways.

MODERNIST POETRY AND PRAGMATIST EVOLUTIONARY THINKING

How did the poets contemporaneous with Dewey respond to the new ways of seeing and knowing engendered by evolutionary thought and its assimilation into pragmatist philosophy? Does the poetry of such prominent writers as Robinson Jeffers, Wallace Stevens, or William Carlos Williams answer at all to Dewey's pragmatist contention that aesthetic experience is grounded in adaptive experiential strategies that seek to reestablish a temporary equilibrium between self and world? These are, of course, large questions to ask, and there can be no single answer to them since these poets differ markedly in thematic orientation and stylistic preferences. Yet a sampling of their work reveals the formative influence that Darwinian evolutionary thought and its pragmatist application exerted on American culture in the first half of the twentieth century.

Robinson Jeffers's sustained interest in natural history and the biophysical environment of the California coast makes his poetry an obvious choice in this context; although Jeffers was a contemporary of Stevens and Williams, he did not share their modernist sensibilities. He saw humanity, to quote a series of metaphors from his famous poem "Roan Stallion" (1925), as "the mould to break away from, the crust to break through, the coal to break into fire, / The atom to be split."[41] Accordingly, he cultivated an attitude and style he called "Inhumanism."[42] The term signals that Jeffers's poetry denies human forms of intelligence and experience a privileged position in the order of things and instead focuses on and valorizes the nonhuman. By foregrounding the description of the natural world,

Jeffers seeks to move beyond human self-absorption. His poems aim to replace an anthropocentric worldview that conceives of humans as the apex of creation with a Darwinian perspective that positions humanity as one life form among many in a heterarchical network of biological and evolutionary relations. Like Darwinism, Jeffers's inhumanism constitutes an effort to reintegrate the human and the nonhuman.[43]

We find a characteristic expression of his inhumanist perspective in the poem "Vulture" (1963), where the speaker finds himself circled by a vulture. Appreciating the majesty of the bird of prey, he muses that although he does not wish to die yet, to be devoured by the vulture would be a good way to go. The poem's last lines read: "What a sublime end of one's body, what an enskyment; / What a life after death."[44] The inversion of Christian and humanist values in these concluding lines is obvious. Jeffers's neologism "enskyment" substitutes for the Christian belief in a heavenly hereafter the speaker's desire to be consumed by the scavenger so as to become literally a part of the bird. This celebratory portrait of the food chain and of transformative natural processes suggests that Jeffers feels very much at home in a Darwinian cosmos: the world he depicts is thoroughly secularized; it is governed by impersonal forces of growth and decay; and the assimilation of humans into the nonhuman gives rise to hope rather than despair.

The anti-anthropocentric drive of Jeffers's poetry accords well with the Darwinian recognition that human life is continuous with the nonhuman. Yet unlike Dewey's adaptation of evolutionary thinking, Jeffers's inhumanism results at times in a renunciation of distinctly human traits. It is an attitude that threatens to disengage the speakers (and implied readers) of Jeffers's poems from social interaction. Closer to Dewey's conception of poetry as a medium that expands rather than restricts our engagement with the cultural worlds we inhabit is the work of the modernist writers Wallace Stevens and William Carlos Williams, who foreground the processes of human cognition and poetic expression.[45] The concern of Stevens and Williams with processes of seeing, thinking, and signifying agrees with Dewey's contention that the objects and aims of inquiry have to change in light of Darwinian theory because it can no longer be the task of scientists, philosophers, and poets to observe the world attentively in search of a fixed design. In an opaque and changing, rather than transparent and stable, world the processes of exploration and explication have to move to the center of attention.

While both Stevens and Williams certainly lived "in the world of Darwin and not in the world of Plato," as Stevens put it in his acceptance speech for the National Book Award in 1955, and while both poets read and commented on Dewey's work, it remains a tricky critical endeavor to pinpoint the exact lines of influence between pragmatist evolutionary thinking and modernist poetry.[46] Darwinian thought profoundly changed U.S. culture in the late nineteenth century

and early twentieth. As a result of this fundamental transformation, the presence of Darwinian concepts has been so pervasive, and their impact so wide ranging, that their influence clearly exceeds any particular connections or specific links that the writers or their critics may have asserted. As Gillian Beer points out: "Precisely because we live in a culture dominated by evolutionary ideas, it is difficult for us to recognize their imaginative power in our daily readings of the world. We need to do so."[47] By framing my reading of modernist poetry with Dewey's ideas about the implications that Darwinian theory holds for our conceptualizations of such fundamental issues as knowledge, experience, art, and the relation of the subject to its environment, I aim to render this context visible again. Dewey theorized (and thus helped his readers understand) possible epistemological, aesthetic, and social ramifications of Darwinism. By considering modernist poetry in light of his work, I hope to show that both Darwinism and pragmatism were pivotal factors in the formation of a cultural environment that enabled modernist experiments with processual and relational poetics.

I do not posit a single, direct line of influence, however, in which Darwin originated a scientific theory that was translated first into a pragmatist worldview by Dewey and then into a modernist poetics by Stevens and Williams. While Stevens's and Williams's modernist poetics of process indeed seem unthinkable in a pre-Darwinian world and while they show clear affinities to pragmatist thought, these authors' poetic concerns, strategies, and choices developed in a complex process that exceeds monocausal explanations. As an exasperated Williams pointed out to Kenneth Burke in 1933 in response to Burke's suggestion that Williams's *The Embodiment of Knowledge* bore obvious parallels to Dewey's work: "If I could convince myself or have anyone else convince me that I were merely following in the steps of Dewey, I'd vomit and quit—at any time. But for the moment I don't believe it—the poetry is offered not too confidently as proof."[48] In seeking to bring into focus the congruence between Stevens's and Williams's poetics and Dewey's Darwinian brand of pragmatist thinking, my interest lies in showing how similar ideas may surface and take different forms in different cultural fields. It is the plurality of responses, including oblique echoes, that indicates how thoroughly infused modern American culture is with Darwinian ideas.

Although neither evolutionary theory nor pragmatist philosophy were central concerns for Stevens, his poetry is pertinent in the context of this essay because his poems frequently explore how interior and exterior realities intertwine in the perceptual, cognitive, and representational processes we undergo as we seek to make sense of the world. His poems suggest a processual and relational understanding of knowledge, subjectivity, and poetic expression that prefigures and recalls Dewey's pragmatist concept of aesthetic experience.[49] An example is "Thirteen Ways of Looking at a Blackbird" (1923), in which Stevens offers us in thirteen stanzas,

just as the title promises, thirteen different conceptualizations of blackbirds. Each stanza adds to the preceding one another way of perceiving the birds. Stanzas 8 and 9, for instance, read as follows:

> VIII
>
> I know noble accents
> And lucid, inescapable rhythms;
> But I know, too,
> That the blackbird is involved
> In what I know.
>
> IX
>
> When the blackbird flew out of sight,
> It marked the edge
> Of one of many circles.[50]

These two stanzas exemplify the poem's focus. It is a meditation on the relation between knowledge, imagination, experience, and expression.

The poem presents human perception and signification as an ongoing process that occurs both in exchange with a cultural matrix—as we find in the allusion to prosody in stanza 8—and in reaction to the biophysical world. To create meaning, the speaker needs to engage with his environment. For although the poem is not concerned with actual birds in themselves, neither does it seek to deny that they exist and matter outside human thought and language. "When the blackbird flew out of sight, / It marked the edge / Of one of many circles." I read this stanza as suggesting that the blackbird exists within and without the speaker's readings of it. When the bird flies out of the speaker's perceptual field, it does not cease to matter. Instead, it enters or forms another circle, which indicates that there are other realities besides the ones represented here; there are more than thirteen ways of looking at and relating to a blackbird—not to mention the various possible modes of being a blackbird. The circle image suggests that there are other fields of existence whose meaning does not revolve around or emanate from the speaker. Knowledge and experience are shown to be relational and transient in character.

By contrasting the different ways of looking at blackbirds, Stevens explores the capacity of the human mind to generate meaning through the ongoing observation and interpretation of the natural world. Rather than create a unified image of the bird, as Jeffers's poem "Vulture" does, Stevens's poem privileges neither one particular way of looking nor one particular explanation of a blackbird's qualities or significance. His thirteen variations on the theme seem to lend credence to Dewey's pragmatist contention that "all deliberate action of mind is in a way an experiment with the world to see what it will stand for, what it will promote and what frustrate."[51] Stevens's speaker and the figures in the poem try out different

responses to the realities they encounter and engender: they creatively engage with birds, posit analogies, think up metaphors, react emotionally with fear or gladness. The competing perspectives are presented in a nonlinear sequence and do not coalesce into a single coherent interpretation. By offering multiple viewpoints rather than one unified explication, the poem suggests that the world cannot be known at once and dramatizes the need for an ongoing perceptual, imaginative, and expressive grappling with reality. Through its processual logic and multiperspectivism, the poem puts on display the workings of the mind while it also "elicits the possibilities that are interwoven within the texture of the actual."[52] Turning at the same time inward and outward, the poem brings into focus the interrelatedness of internal and external realities.

"Thirteen Ways of Looking at a Blackbird" thus exemplifies Stevens's maxim that "poetic truth is an agreement with reality, brought about by the imagination."[53] By suggesting that the objective of poetry is the use of the imagination to reach "an agreement with reality," Stevens follows the pragmatist tradition. His statement brings to mind Dewey's proposition that art increases our capacity to align ourselves continually with our environment by offering us intensified forms of experience that enable both self-reflection and new lines of inquiry and action. According to Jonathan Levin, Stevens held that "poetry serves to refine and extend powers of perception" and thought of it as "a means of cultivating possible forms of engaged experience as well as a more richly and diversely enlightened understanding of that experience."[54] There is a close correspondence between Stevens's idea that poetry deepens our imaginative engagement with the world by sharpening and expanding our perceptual and self-reflexive powers and Dewey's pragmatist conception of art as a concentrated form of experience that both allows us to reflect on our habitual modes of response and opens up new possibilities for participating in the world. Yet while Dewey conceives of this experiential function of art in clearly Darwinian terms, arguing that art trains us "to meet the impact of surrounding forces, to meet so as to endure and to persist,"[55] Stevens does not attribute an evolutionary trajectory to his poetics.

Dewey's keen interest in the contribution that the interaction with environmental factors made to the formation of subjectivities, communities, and aesthetic practices was shared by William Carlos Williams. Like Dewey's work, Williams's poetry expresses the belief that both quotidian experiences and their intensified aesthetic renderings grow out of our ongoing exchanges with the places we inhabit. His poems suggest that we create meaning and art by undergoing experiential processes that originate in our encounter with environmental forces, which invite yet resist us, and that our understanding of ourselves and the world builds as we try to synchronize these forces with our own ways of being. An exemplary poem in this respect is "The Wind Increases" (1930), which combines landscape description with a reflection on processes of perception and signification.

In "The Wind Increases," the speaker confronts a windswept spring landscape that displays the signs of first vegetation but still is mostly barren.[56] The first stanza reads:

> The harried
> earth is swept
> The trees
> the tulip's bright
> tips
> sidle and
> toss—

The stanza emphasizes both the singularity and the movement of the phenomena that have caught the speaker's attention. The line breaks isolate the plants from the ground and from one another while the typographical arrangement of the words mimics the plants' movement. The irregular placement and the gaps between the words imitate the spaces between the trees and the flowers, which the wind moves through.

The parallel between the organization of the observed natural scene and the layout of the poem is significant because the wind not only assails the landscape and its vegetation but also troubles the speaker. In its free-blown movement and sound, the wind makes him question what a poet is. "Good Christ," he asks in exasperation, "what is / a poet—if any / exists?" In the center of the poem we find his answer:

> a man
> whose words will
> bite
> their way
> home—being actual
> having the form
> of motion

The formal resemblance of this stanza to the first one is obvious. Again, the arrangement of the words on the page singles out different entities and enacts motion. Yet what moves through and reveals the order of things here is not the wind but poetic expression. Articulation is portrayed as an aggressive yet nourishing act. The poet devours the world as he speaks it, yet the process also transforms him. The poem displays an interaction with a resisting but also accommodating world, which returns him from doubt to a firm basis: home. This foundation remains transient or processual, however, since it consists of movement.

Read in the context of this essay, the poem seems to enact the dynamics of aesthetic experience that Dewey described. It presents poetic expression as a relational process into which the speaker enters not as a self-contained agent but as a

communicating agency, as "a factor absorbed in what is produced."[57] The poem offers the speaker a way to negotiate opposing environmental forces and to ground himself in a world in flux, and it ends this way:

> At each twigtip
>
> new
>
> upon the tortured
> body of thought
>
> gripping
>
> the ground
>
> a way
> to the last leaftip

Again, the stanza dramatizes motion. In this case it is a movement that rushes from the outermost points of the tree—the ends of the branches where the leaves will bud, each a novelty, a single new beginning—to the ground, before it leaps back "to the last leaftip," to the end of things. Literal and metaphoric readings of the natural world blend as the action of the tree, tapping the earth for energy to grow new leaves, overlaps with the struggle of the poet for expression. By singling out words and grouping lines together, by combining irregular indentation and enjambment, the poem is arranged in typographical patterns that suggest similarities between the natural forces the speaker observes and the creative processes he undergoes. In its last movement the poem as an object even begins to resemble a tree. Its lines are now clearly spaced apart, suggesting the shape of barren branches.

In its staging of the speaker's search for adequate expression vis-à-vis the windswept landscape, the design of Williams's "The Wind Increases" creates an effect similar to the multiperspectivism of Stevens's "Thirteen Ways of Looking." By foregrounding the processes of perception and signification, the poems *do* rather than say, perform rather than state. They generate a knowledge of the world that is grounded in the transformative exchanges between experiencing subjects and their environing worlds. Locating "the appropriate objects and organs of knowledge in the mutual interactions of changing things," they follow a processual and relational logic—a mode of thinking that Dewey identified as one of the most significant legacies of evolutionary theory.[58]

My reading of the exchanges between evolutionary theory, pragmatism, and literary genres attests to the profound and wide-ranging impact that Darwinism has had on U.S. culture. On the one hand, interrelations between evolutionary thought and philosophic and literary practices were forged through the deliberate adaptation of specific ideas and terms by individual writers and thinkers; on the

other hand, they occurred as a result of broader cultural shifts. As the different cultures of knowledge and expression intersected, they often complemented and augmented one another. We have seen this dynamic at work in the emergence of naturalism, in Dewey's pragmatist appropriation of evolutionary theory, in Jeffers's development of an inhumanist perspective and style, and in the assimilation of both evolutionary and pragmatist thinking into process-oriented modernist poetics. There is a remarkable confluence between Dewey's experiential concept of knowledge and aesthetics and the poetics of Stevens and Williams. Poems like "Thirteen Ways of Looking" and "The Wind Increases" realize Dewey's idea that our knowledge and subjectivity are best conceptualized in relational and processual terms because they develop through our continual interaction with our cultural and natural environments.

In the late nineteenth century and early twentieth, productive exchanges between different areas of inquiry and experience were facilitated by the common vocabulary and strategies of representation that science, philosophy, and literature still shared.[59] Beer stresses the fact that in Darwin's time scientific treatises were written in a nonspecialist mode that allowed the general public to read these works firsthand.[60] Williams, for instance, was encouraged by his father to read Darwin's *On the Origin of Species* and *The Descent of Man* alongside other classics.[61] Since the boundaries between disciplines and cultural areas were permeable, ideas could develop and spread in feedback loops between writers and readers of different fields of inquiry and expression. As Beer has shown in *Darwin's Plots*, the intense and sustained public response to Darwin's *Origin* is to a significant degree a consequence of the literary quality of his argumentation, enabled in particular by his use of metaphors and narrative patterns that allowed him to communicate his groundbreaking and potentially disturbing ideas to his readers.

The different forms of discourse interacted at times, however, not only to refine and expand but also to challenge and invalidate one another. This holds true both for the relations between larger cultural fields like the natural sciences and literature, as exemplified by the compensatory response of the nature fakers to Darwinism, and for the relations between different strands within a single field, as demonstrated by the conflicting contemporaneous reactions of the naturalists and the nature fakers to evolutionary theory. Still, whether the scientific, philosophical, and literary imaginations converged or remained incompatible, the exchange often advanced the development of each distinct culture. The nature faker debate, for instance, introduced new standards of scientific accuracy to the nature writing tradition.

Studying the wide-ranging influence of Darwinism on American writers opens up new angles on the dynamics of literary history. It also enables us to conceive of the cultural functions that literary texts may perform in Darwin-inspired terms. If we read modernist poetry in light of pragmatist evolutionary thought, for instance, we arrive at an understanding of literature as a medium that allows us to reflect on

and experiment with our habitual modes of perception and signification. Literary works render palpable the processes through which we experience the world, because in them, as Dewey proposes, the subject and object of knowledge and expression are thoroughly integrated.[62] The moments in which we are "both most alive and most composed and concentrated," Dewey points out, "are those of fullest intercourse with the environment." Hence, he continues, "Art would not amplify experience if it withdrew the self into the self nor would the experience that results from such retirement be expressive."[63] The resonance of pragmatist evolutionary thought in modernist poetry invites us to ask what relevance scientific and literary modes of inquiry and expression carry for our lived experience. Do they sharpen our awareness of the processes through which we continually participate in our cultural and biophysical environments? Do they increase our capacity to interact with others, to direct change, and to align ourselves with the situations we encounter? Do they encourage us to explore yet unrealized possibilities?

The varied reverberations of Darwinism in American literature and philosophy show that scientific discourse acquires divergent meanings as it enters different cultural contexts. Although scientific theories may describe biological processes that happen independently of our choices, such as evolution, our readings of these theories are informed by our cultural preferences and practices. Depending on our previous experience and knowledge, we may reject a certain theory or adopt it as an enabling model. In this sense, the pragmatists and modernists under consideration "chose" to evolve. In their work the notion of an unfinished, continually emerging world does not signal deficiency and uncertainty but opens up the possibility of deliberate action and full literary expression. The intersecting scientific, philosophical, and literary conversations that make up the American reception of Darwinism suggest, then, that a culturally innovative potential inheres in the resonances and tensions between our different modes of knowledge and signification. To realize this possibility, however, remains optional. As William Carlos Williams reminds us in "The Dance" (1962):

> there are always two,
>
> yourself and the other,
> the point of your shoe setting the pace,
> if you break away and run
> the dance is over[64]

NOTES

1. John Dewey, *Art as Experience* (New York: Perigee, 1980), 345.

2. The argument for natural selection runs roughly like this: more organisms exist than can survive. In trying to ensure their survival, organisms adapt to circumstance. In the

process of this adaptation, random variations arise. These variations, if they prove to have survival value, are passed on to ensure the flourishing of the next generation.

3. Charles Darwin, *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life* (London: Dent, 1971), 463.

4. I am grateful to Suzanne Clark at the University of Oregon, Eugene, who is currently working on a book about the natural history of modernism, for first pointing out to me the scientific context and cultural ramifications of Darwin's theory.

5. Cf. James R. Moore, *The Post-Darwinian Controversies* (Cambridge: Cambridge University Press, 1979).

6. Lisa Mighetto, "Science, Sentiment, and Anxiety: American Nature Writing at the Turn of the Century," *Pacific Historical Review* (Feb. 1985): 33–50, 35.

7. Cf. June Howard, *Form and History in American Literary Naturalism* (Chapel Hill: University of North Carolina Press, 1985).

8. Ernest Thompson Seton, "The Natural History of the Ten Commandments," *Century* 75 (Nov. 1907): 24–33; William J. Long, *School of the Woods: Some Life Studies of Animal Instincts and Animal Training* (Boston: Ginn, 1903).

9. Long, *School of the Woods*, 18.

10. Cf. Mighetto, "Science, Sentiment, and Anxiety," 40.

11. Qtd. in Ralph Lutts, *The Nature Fakers: Wildlife, Science and Sentiment* (Golden, Colo.: Fulcrum, 1990), 130.

12. "Evolution, Creationism, Intelligent Design," *Gallup*, http://www.gallup.com/poll/21814/evolution-creationism-intelligent-design.aspx (accessed Sept. 17, 2012). The Gallup poll was conducted in May 2012. The figures have remained almost constant in the last three decades, as comparisons with earlier surveys show. Gallup has been conducting polls on this issue since 1982. Frank Newport, "In U.S., 46% Hold Creationist View of Human Origins," *Gallup*, http://www.gallup.com/poll/155003/Hold-Creationist-View-Human-Origins.aspx.

13. John Dewey, "The Influence of Darwinism on Philosophy" (1909), in his *The Influence of Darwinism on Philosophy and Other Essays in Contemporary Thought* (New York: Peter Smith, 1951), 1–19, 12.

14. While the proponents of intelligent design posit an intelligent cause behind the diversity of life, they differ from creationists in that they do not identify this cause with God. A prominent advocate of intelligent design is the former president of the United States George W. Bush. His suggestion that intelligent design be taught in high schools alongside evolutionary theory caused a minor stir in American publications. Bush's science adviser, John Marburger, was quick to point out that the president had merely meant to suggest that the controversy about evolution should be taught. Glenn Branch, "President Bush Addresses 'Intelligent Design,'" *Reports of the National Center for Science Education* 25, nos. 3–4 (May–June 2005): 13–14, http://ncse.com/rncse/25/3-4/president-bush-addresses-intelligent-design (accessed Sept. 17, 2012).

15. "The State of State Science Standards 2012," Thomas B. Fordham Institute, http://www.edexcellence.net/publications/the-state-of-state-science-standards-2012.html (accessed Sept. 17, 2012). See in particular pages 9–10 of the report.

16. Dewey, "Influence of Darwinism on Philosophy," 2.

17. John Dewey, "Philosophy and Democracy" (1919), in John Dewey, *The Middle Works,*

1899–1924, vol. 11: *1918–1919*, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1988), 41–53, 52.

18. Dewey, "Influence of Darwinism on Philosophy," 1–2.

19. Ibid., 13.

20. For a survey of pragmatist thought, see Morris Dickstein, ed., *The Revival of Pragmatism: New Essays on Social Thought, Law, and Culture* (Durham, N.C.: Duke University Press, 1998). On the historical emergence of pragmatism, see Louis Menand, *The Metaphysical Club* (New York: Farrar, Straus and Giroux, 2001).

21. This idea has reentered the life sciences. Cognitive psychologists argue that our mind works not in the abstract but functions in the context of specific tasks. They maintain that our consciousness consists of specialized modules or "highly domain-specific cognitive mechanisms" that help us, for instance, to recognize faces or traverse spaces. Brian Boyd, "Jane, Meet Charles: Literature, Evolution, and Human Nature," *Philosophy and Literature* 22, no. 1 (1998): 1–30, 7, 9.

22. Dewey, "Philosophy and Democracy," 48.

23. Ibid., 47.

24. Dewey, *Art as Experience*, 263.

25. Dewey, "Philosophy and Democracy," 48–49.

26. Dewey, "Influence of Darwinism on Philosophy," 15.

27. Ibid., 17.

28. Dewey, "Philosophy and Democracy," 50.

29. John Dewey, "Ethics and Physical Science" (1887), in John Dewey, *The Early Works, 1882–1898*, vol. 1: *1882–1888*, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1969), 205–26, 213. Dewey wrote this essay at a time when he still was highly critical of attempts to apply evolutionary thinking to the social realm. Robert B. Westbrook, *John Dewey and American Democracy* (Ithaca, N.Y.: Cornell University Press, 1991), 31–32. Westbrook offers a thorough account of Dewey's intellectual development.

30. John Dewey, "Evolution and Ethics" (1898), in John Dewey, *The Early Works, 1882–1898*, vol. 5: *1895–1898*, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1969), 34–53, 53.

31. John Dewey, "Creative Democracy—The Task before Us" (1939), in John Dewey, *The Later Works, 1925–1953*, vol. 14: *1939–1941*, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1991), 224–30, 229.

32. John Dewey, *Democracy and Education* (1916), in John Dewey, *The Middle Works, 1899–1924*, vol. 9: *1916*, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1980), 93.

33. Dewey, "Creative Democracy," 230.

34. Ibid., 226.

35. Dewey, *Art as Experience*, 290.

36. Ibid., 244.

37. Ibid.

38. Ibid., 212.

39. Ibid., 27.

40. John Dewey, *Reconstruction in Philosophy* (New York: Mentor, 1954), 109.

41. Robinson Jeffers, *Selected Poems* (New York: Vintage, 1963), 24.

42. Robinson Jeffers, *The Double Axe and Other Poems* (New York: Random House, 1948), vii.

43. Jeffers relates his concept of inhumanism to the paradigm shifts brought about by Copernicus and Darwin in the poem "The Inhumanist." The poem's title character praises the scientists for their anti-anthropocentric orientation, dedicating a makeshift monument to Copernicus "'who first pushed man / Out of his insane self-importance and the world's navel, and taught him his place.' / 'And the next one to Darwin.'" Jeffers, *Double Axe,* 72. For an extensive positive appraisal of Jeffers's inhumanism, see Max Oelschlaeger, *The Idea of Wilderness: From Prehistory to the Age of Ecology* (New Haven, Conn.: Yale University Press, 1991), 245–61.

44. Jeffers, *Selected Poems*, 107.

45. On the similarities and differences of Stevens's and Williams's poetics, see Albert Gelpi, "Stevens and Williams: The Epistemology of Modernism," in *Wallace Stevens: the Poetics of Modernism*, ed. Albert Gelpi (Cambridge: Cambridge University Press, 1990), 3–23; and Lisa M. Steinman, *Made in America: Science, Technology, and American Modernist Poets* (New Haven, Conn.: Yale University Press, 1987).

46. Wallace Stevens, *Opus Posthumous*, ed. Samuel French Morse (New York: Knopf, 1957), 246.

47. Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction* (London: Routledge, 1983), 5.

48. William Carlos Williams, *The Selected Letters of William Carlos Williams*, ed. John C. Thirlwall (New York: McDowell, Oblensky, 1957), 138. The passage is also quoted by John Beck and Astrid Franke, who both make a strong and convincing argument for the confluence of Dewey's and Williams's work without asserting any direct causal relation. Beck, *Writing the Radical Center: William Carlos Williams, John Dewey, and American Cultural Politics* (Albany: State University of New York Press, 2001), 57; Franke, "William Carlos Williams and John Dewey on the Public, Its Problems, and Its Poetry," in *REAL: The Yearbook of Research in English and American Literature*, vol. 19, ed. Winfried Fluck and Thomas Clavier (Tuebingen, Germany: Narr, 2003), 269–92, 269. Williams read Dewey's work, including his essays in the *Dial* and *Art as Experience*. See Alec Marsh, *Money and Modernity: Pound, Williams, and the Spirit of Jefferson* (Tuscaloosa: University of Alabama Press, 1998), 190; and Beck, *Writing the Radical Center*, 57. He also acknowledged that he first encountered a concept that became essential for his work—the idea that the local was of central cultural importance—in Dewey's essay "Americanism and Localism" (1920). In a letter to Horace Gregory in 1944, for instance, Williams writes, "something I have been saying for a generation: that there is no universal except in the local. I myself took it from Dewey. So it is not new" (*Selected Letters*, 224). Noting the numerous references that Williams made in his letters, essays, and the preface to *Paterson* to Dewey's dictum, Marsh argues that Williams was working "in a recurrent mental dialogue with the writing of John Dewey" (*Money and Modernity*, 172) and that Dewey's essay "exerted a formative influence, even a determining one, on Williams and *Paterson*" (ibid., 193). "Americanism and Localism" is reprinted in John Dewey, *The Middle Works, 1899–1924*, vol. 12: *1920*, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1991), 12–16.

49. Stevens read but rarely commented on Dewey's work. In a letter to Henry Church in March 1943, he briefly notes: "There is an article by John Dewey on Philosophic Naturalism which strikes me as being valuable." Wallace Stevens, *Letters of Wallace Stevens*, ed. Holly Stevens (Berkeley: University of California Press, 1996), 441. The essay is Dewey's "Anti-Naturalism in Extremis," which had appeared the previous month in *Partisan Review*. Cf. Joan Richardson, *Wallace Stevens: The Later Years, 1923–1955* (New York: Beech Tree and William Morrow, 1988), 216–17. Stevens came into contact with pragmatism as a student at Harvard in the late 1890s, when William James was teaching philosophy and psychology there. James Longenbach, "Stevens and His Contemporaries," in *The Cambridge Companion to Wallace Stevens*, ed. John N. Serio (Cambridge: Cambridge University Press, 2007), 76–86, 76.

50. Wallace Stevens, *Collected Poetry and Prose*, ed. Frank Kermode and Joan Richardson (New York: Library of America, 1997), 75–76.

51. Dewey, "Philosophy and Democracy," 48–49.

52. Dewey, *Art as Experience*, 345.

53. Wallace Stevens, *The Necessary Angel: Essays on Reality and the Imagination* (London: Faber and Faber 1955), 54.

54. Jonathan Levin, *The Poetics of Transition: Emerson, Pragmatism, and American Literary Modernism* (Durham, N.C.: Duke University Press, 1999), 167.

55. Dewey, *Art as Experience*, 212.

56. William Carlos Williams, *The Collected Poems of William Carlos Williams*, vol. 1: *1909–1939*, ed. A. Walton Litz and Christopher MacGowan (Manchester, England: Carcanet, 1987), 339.

57. Dewey, *Art as Experience*, 250.

58. Dewey, "Influence of Darwinism on Philosophy," 6.

59. Beer, *Darwin's Plots*, 6–7.

60. Ibid.

61. Paul Mariani, *William Carlos Williams: A New World Naked* (New York: McGraw Hill, 1981), 12.

62. Dewey, *Art as Experience*, 277.

63. Ibid., 103.

64. William Carlos Williams, *The Collected Poems*, vol. 2: *1939–1962*, ed. Christopher MacGowan (Manchester, England: Carcanet, 1988), 407.

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KIMBERLY A. HAMLIN

Sexual Selection and the Economics of Marriage

"Female Choice" in the Writings of Edward Bellamy and Charlotte Perkins Gilman

To most modern americans, evolution is synonymous with "natural selection," the evolutionary mechanism that Charles Darwin introduced in *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life* (1859). To most nineteenth-century Americans, however, "evolution" had more nuanced meanings. To them, evolution sometimes meant natural selection, and it sometimes referred to the ideas of other naturalists and scientific popularizers. Regardless of how and why nineteenth-century Americans thought evolution occurred, evolution almost always implied teleological progress and was typically invoked to support the characteristically American conviction that the world was constantly changing for the better.[1] From this vantage point, then, the popularity of evolutionary ideas in the United States did not so much signal a widespread embrace of Darwinian science but rather a rearticulation of Americans' unbridled faith in progress in scientific terms.[2]

Yet, Gilded Age Americans disagreed on just what exactly evolutionary "progress" might look like. History textbooks often align robber barons and conservative politicians with an embrace of the social applications of Darwinism, but in fact individuals from across the ideological spectrum invoked Darwinian concepts to describe their ideal world and the processes by which this ideal might be attained.[3] Like their more conservative counterparts, left-leaning reformers were energized by Darwinian evolution, and they too often couched their ideas in Darwinian language, though they did not tend to invoke natural selection. For these more liberal reformers, natural selection did not support the sort of egalitarian, altruistic future that they hoped humans were evolving toward. Natural selection implied a cold, random universe where the "strongest" survived but no one knew for sure the standards of fitness. This was also a world in which education, intellect, and

compassion played little or no role. Left-leaning reformers argued that intellect and compassion distinguished humans from animals and, thus, that it would be counter-evolutionary to embrace the survival-of-the-fittest ethos that characterized Gilded Age capitalism. Rather than invoke natural selection, these reformers embraced a second evolutionary mechanism known as "sexual selection," which Darwin introduced in *The Descent of Man, and Selection in Relation to Sex* (1871). In contrast to natural selection, sexual selection suggested that human reproductive choices, conscious or otherwise, significantly shaped evolutionary development and could lead to vast social change. For more radical reformers, especially socialists and feminists, sexual selection merged their belief in progress-oriented evolution with their faith in human reasoning and allowed them to talk in the much-valued language of evolutionary science.

Darwin first grappled with sexual selection in unpublished writings from the 1840s, and he alluded to the theory in two pages of *The Origin of Species*.[4] There, he defined sexual selection as "not a struggle for existence, but . . . a struggle between the males for possession of the females," a sort of corollary to natural selection. He claimed that sexual selection accounted for differences in "structure, colour, or ornament" in species where "the males and females have the same general habits of life."[5] In the years between the publication of *Origin* and *Descent*, he continued to puzzle over the persistence of maladaptive traits, traits that conferred no survival advantages to their possessors and thus could not be explained by natural selection. Why had traits such as the peacock's bright plumage survived?

In *The Descent of Man*, Darwin concluded that maladaptive traits continued to be passed on to future generations simply because the opposite sex found them attractive, thereby increasing the odds that the peacock with the most brilliant plumage, for example, would leave many offspring.[6] As a result of revelations such as this, over the course of his lifetime Darwin came to believe that the struggle to reproduce was at least as important, and in some cases more important, than the struggle to survive. This realization seemed to have surprised even Darwin. As he confessed, "It could never have been anticipated that the power to charm the female has been in some few instances more important than the power to conquer the other males in battle."[7] For various reasons, many nineteenth-century naturalists rejected sexual selection theory, but in the years before his death Darwin became only more convinced of it.[8] In a letter read before the Zoological Society of London in 1882, just hours before his death, Darwin once again affirmed his belief in sexual selection: "I may perhaps be here permitted to say that, after having carefully weighed, to the best of my ability, the various arguments which have been advanced against the principle of sexual selection, I remain firmly convinced of its truth."[9]

The two main tenets of sexual selection were male battle (for the attention of females and to outdo other males) and female choice of sexual partners. In a

Darwinian world, males competed with each other for access to females, while females were "coy" and selected the most ornamented and vigorous males. Darwin presented considerable evidence to demonstrate that female choice predominated in birds, and based on bird customs and the observations of numerous animal breeders, he mused, "it would be a strange anomaly if female quadrupeds, which stand higher in the scale and have higher mental powers, did not generally, or at least often, exert some choice."[10] This practice endured further up the chain of being as well: "The semi-human progenitors of man, like their allies the Quadrumana, will almost certainly have been thus modified [sexual selection by female choice]; and, as savages still fight for the possession of their women, a similar process of selection has probably gone on in a greater or less[er] degree to the present day."[11] Among humans, however, Darwin posited that "man is more powerful in body and mind than woman, and in the savage state he keeps her in a far more abject state of bondage than does the male of any other animals; therefore it is not surprising that he should have gained the power of selection."[12] Whereas women initially wielded the power of selection—and occasionally still did among "utterly barbarous tribes"—men usurped this power as humans evolved to became more "civilized," which to Darwin was synonymous with patriarchal. Loss of female choice, as Darwin described it, appeared to be a requisite change in the transition to becoming fully human.

For their part, men tended to pick only the most beautiful women as mates with little regard for their overall fitness or health (except to the extent that beauty indicated health). As Darwin observed, "In civilised life man is largely but by no means exclusively, influenced in the choice of his wife by external appearance."[13] In addition to ingrained Victorian ideas about the differences between men and women, Darwin was led to this conclusion by his observation that among humans, women were the more highly ornamented sex, a telltale marker of membership in the category "selected," not "selector."[14] In modern times, women attracted and men selected.

Even as naturalists debated sexual selection, *The Descent of Man* and its cornerstone theory reverberated widely throughout American culture. Referring to sexual selection, the *New York Times* reported, "nothing that Darwin has written is so ingenious or suggestive than the long, minute, and careful investigation in this field."[15] Another literary notice observed, "The very general discussion by the press of Darwin's 'The Descent of Man' has, instead of exhausting public interest in this latest scientific question, greatly stimulated it. The sale of Darwin's work is almost unprecedented in scientific literature."[16] *Old and New* declared *Descent* to be "as exciting as any novel."[17] *Appleton's* noted that the book was the literary sensation of the month, while *Harper's* announced that one could not open a magazine without reading about it.[18] It appeared on prominent book lists for women's and girls' clubs until the turn of the twentieth century, and the *New York Times* reported that it

was among the most popular books checked out of Manhattan public libraries as late as 1895.[19] Nineteenth-century Americans eagerly read *The Descent of Man*, and left-leaning reformers embraced the concept of female choice.

Female choice particularly appealed to feminists and socialists in the United States and abroad. These reformers did not seem concerned, or in some cases even aware, that many naturalists rejected the theory of sexual selection and the predominance of female choice in animals. For them, it was enough that Darwin, the great naturalist, had articulated the concept and given it his imprimatur. Furthermore, feminist reformers were not so much concerned with whether female choice occurred among animals but, rather, whether it *could* occur among humans. Voicing their demands for change in the language of "female choice" allowed reformers to claim that their ideas were not radical but "natural" since, according to Darwin, female choice was the norm in all animal species except humans. To these reformers, women's subordinate status in patriarchal, capitalist societies stood out as "unnatural." As new scientific research cast doubt on the Lamarckian idea that traits acquired in one's lifetime could be inherited by offspring (though many people continued to cling to this idea), female choice provided a new language for reformers seeking intentional, intergenerational change. Moreover, since Darwin spent the bulk of *The Descent of Man* (and much of his later work) arguing for human-animal kinship on all levels, his denial of female choice among humans alone seemed arbitrary to feminist reformers. If it was natural and desirable for females throughout the animal kingdom to select their mates, and if humans were indeed animals, why was female choice not the norm among humans?

Feminists and socialists also seized on female choice because it linked their objections to capitalism with their concerns about patriarchy. These reformers believed that capitalism and patriarchy worked together to ensure that women remained subordinate to men, especially through marriage customs. Because most women could not support themselves financially, they had to marry a man, any man, in order to survive, throwing off the natural process of sexual selection by introducing money into the equation. Thus, female choice presented feminists and socialists with one unified way to critique the institution of marriage, decry the lack of economic opportunities for women, denounce capitalism for creating a class of wealthy people for whom fitness was not a criterion for mating or success, and reject the type of women—corseted, weak, and submissive—so often selected as wives by men. To activists of various stripes, a return to female choice among humans not only promised to cure many modern social problems, it also provided a naturalistic rationale for the type of "progress" that feminists and socialists envisioned. At the turn of the twentieth century, Americans became familiar with the revolutionary potential of female choice largely through the writings of Edward Bellamy and Charlotte Perkins Gilman.

SOCIALISM AND SEXUAL SELECTION IN BELLAMY'S *LOOKING BACKWARD* AND *EQUALITY*

Throughout the Gilded Age, many reformers expressed concern that industrial capitalism did not reward the "best" people and, even worse, that the individualistic tendencies fostered by capitalism would be passed on to succeeding generations, making future change increasingly unlikely. Rather than reward decent, hard-working people, capitalism allowed the unscrupulous ones to prosper and leave their fortunes to their undeserving offspring. Moreover, reformers feared that the excesses of capitalism, together with lax inheritance laws, had resulted in a situation where inordinately rich men also had unfair advantages in mating. Regardless of how attractive, kind, or smart a wealthy man was, he could nearly always select a beautiful young woman to marry and then proceed to reproduce as much or as little as he pleased. While rich men snatched the most desirable mates, the remaining men—who may have had better personalities, keener intellects, and stronger bodies—often did not prosper under capitalism and thus were not considered the top suitors when it came to marriage. Compounding this signature problem with capitalism was the fact that in modern society women's marital choices were further hampered by the economics of patriarchy. Since few women could support themselves financially, most were compelled to marry, whether they were attracted to their husbands or not, simply to have a roof over their heads and food on the table. As a result of these concerns about the mating advantages of capitalist elites and women's inability to marry for attraction and love, female choice especially appealed to socialists.[20] They believed that a socialist society would create economically independent women and thus remove the economic factor from marriage choices, allowing women to freely select their mates according to inclination, not survival. An added bonus of such a system would be the improved health of offspring because, presumably, these independent women would select only the healthiest and best of men.

So strong was the appeal of female choice to socialists that by 1890 Alfred Russel Wallace, the co-discoverer of natural selection and the leading scientific opponent of sexual selection, began advocating female choice among humans, the very concept he had spent years trying to discredit.[21] After applauding the recent advances made by women, Wallace suggested that the driving factor in any meaningful societal reform would be female choice in marriage partners: "I hope I make it clear that women must be free to marry or not to marry before there can be true natural selection in the most important relationship of life. . . . In order to cleanse society of the unfit [and allow natural selection to proceed], we must give to woman the power of selection in marriage, and the means by which this most important and desirable end can be attained will be brought about by giving her such training and

education as shall render her economically independent."[22] Wallace still did not think female choice occurred among animals, which he believed were incapable of exercising "choice." But among rational humans, he suggested that female choice could be a conscious, political attempt to thwart the counter-evolutionary tendencies of capitalism.

Wallace's position on female choice depended on his acceptance of eugenic ideas about the "cleansing" of the "unfit," but he rejected state-sponsored eugenics in favor of empowering individual women to make the best choices for themselves. Wallace believed in women's political and economic equality with men and, further, he argued that such equality was vital for the future evolution of humankind. According to British scholar David Stack's study of socialist Darwinians in England: "True natural selection [in Wallace's mind] required that women be free in their selection of sexual partner. This process had been perverted by a social system that stripped women of all rights and encouraged them to marry for financial gain rather than sexual emotion. Once this was rectified then marriages to the idle, the utterly selfish and the insane would diminish and women's higher social status as sexual selectors would make them the future 'regenerators of the entire race.'"[23] As Stack persuasively argues, Wallace merged the success of the women's movement with that of socialism, and he believed that both reforms adhered to natural laws. Unlike mainstream eugenicists, Wallace and other feminist socialists advocated for female choice because of their commitment to women's economic and reproductive autonomy, and only to a lesser extent because of their concerns about the fitness of future offspring.

In September 1913, the *Masses*, a popular socialist magazine in the United States, cheered Wallace for uniting evolution with women's rights:

> Sex selection and the survival of the fittest are held mainly responsible for the course of evolution. Sex selection means the choice—especially by the female—of superior mates. Hence the elimination of inferior qualities in posterity. This free act of natural passion is what has lifted and conserved the race. Alfred Russel Wallace—known as the co-discoverer with Darwin of these principles—says that our civilization, in making women economically dependent upon men has destroyed the action of the first principle. The lifting and conserving power of woman's choice is lost, because her choice is not free. For there is no freedom but that is grounded in economic independence.[24]

Here, the editors of the *Masses* reiterated Wallace's main point that it was unnatural and counter-evolutionary for one sex to be dependent on the other for survival, showing the appeal of female choice among feminist socialists in the United States. Moreover, the *Masses*' praise for Wallace demonstrated that left-leaning reformers felt affirmed by enlisting Wallace and evolutionary science more broadly to their cause.

What prompted Wallace's historic and highly publicized change of heart regarding female choice was reading Edward Bellamy's utopian novel *Looking Backward: 2000–1887* (1888), one of the best-selling books of the nineteenth century.[25] In fact, *Looking Backward* became only the second American novel (after *Uncle Tom's Cabin*) to sell one million copies.[26] Wallace biographer Martin Fichman describes Bellamy as Wallace's "mentor" and details at length the transformative experience Wallace had as a result of reading *Looking Backward* soon after it was published. The working-class Wallace had long been drawn to socialist ideas but feared they were too authoritarian; likewise, he knew that human reproductive choices directed the future evolution of the species, but he rejected eugenics as similarly authoritarian and also too elitist. In Bellamy's socialist utopia, Wallace found precisely the balance of individual freedom and social equality for which he had long searched. As Fichman explains, Wallace thought Bellamy's brand of socialism would remove the "disparities of wealth and rank" and "eliminate the economic and political prejudices that . . . dominated the selection of reproductive partners in Victorian society. In their place, mate choice would focus on those higher moral and intellectual traits often neglected (or rendered subservient) in competitive capitalist society."[27] Wallace elaborated on his socialist ideas in several publications from 1890 until his death in 1913, beginning with his essay "Human Selection" in which he declared himself a socialist as a result of having read *Looking Backward*. Years later, as he surveyed his life's accomplishments, Wallace concluded that sexual selection by women in a socialist society was "by far the most important of the new ideas I have given to the world."[28] Fichman makes clear, however, that Wallace largely borrowed this idea from Bellamy's *Looking Backward*.

In addition to being a best-selling novel, *Looking Backward* was also one of the most politically influential publications of the nineteenth century. Translated into several languages, it inspired a mass movement in the United States known as "Nationalism." Soon after the book's publication, Nationalist clubs sprang up throughout the country, particularly in the Northeast and in California. In the 1892 election, the Populist candidate, James B. Weaver, adopted several Nationalist principles and garnered a million votes.[29] Bellamy remained a national figure until his death from tuberculosis in 1898. Bellamy also revived and revised the tradition of utopian fiction for nineteenth-century readers and authors, dozens of whom followed his example and published their own utopian novels, including Charlotte Perkins Gilman, the era's most prolific feminist thinker.

Upon closer examination, however, Bellamy's landmark novel was not quite socialist or feminist, though it appealed strongly to both groups in its day. In her study of utopian fiction, Dohra Ahmad credits Bellamy with updating utopian fiction in light of the popular acceptance of goal-oriented evolution and the characteristic American faith in "progress." Ahmad describes the tradition of utopian fiction created by Bellamy, in contrast to earlier utopian fiction, as "developmen-

talist" because Bellamy's utopia is based on the idea that progressive change inevitably happens over time, and it is grounded in time (generally, the near future) not in space, as previous utopias had been.[30] Bellamy's utopia takes place in Boston in the year 2000. In just 113 years, the economy has become, essentially, "public capitalism" with the state taking over all industries and allotting each individual man and woman an equal share of the nation's earnings, regardless of their job.[31] All profits are returned to the state in the form of public parks, public art, music programs, and public schools, so that everyone benefits from them. In this utopia, there is no such thing as money or investments, but there is still plenty of opportunity for consumption. Individual earnings come in the form of a state-issued credit card that can be used to purchase the goods, necessities, and services of each individual's choice. Some individuals might prefer bigger or fancier homes, meaning they would simply have fewer resources to spend in other areas; others might prefer to spend their money on clothes, books, or furniture, leaving them less for rent.

Even though the economy in his novel is collective and the profits are shared equally, Bellamy did not consider himself a socialist. Rather, he promoted a mild, middle-class, Americanized version of public capitalism brought about gradually, and consensually, by an educated class of experts, not an organized mass of laborers. *Looking Backward* was written in the context of the deadly Haymarket riots (1886), and Bellamy distinguished his American brand of socialism from what he considered to be its dangerous European cousin.[32] As Ahmad suggests, Bellamy might more accurately be considered a British Fabian in an American context (Fabianism refers to the British school of socialism known for advocating gradual change through education rather than strikes or demonstrations).[33] Tellingly, Bellamy's utopia, as Ahmad and other Bellamy scholars have argued, contains no workers or workers' culture and is, like Gilman's, completely bourgeois in character.[34] This made his novel particularly appealing not to union leaders and labor organizers, but to educated middle-class reformers, especially women.

In *Looking Backward*, Bellamy introduces the reader to his utopia through the eyes of narrator Julian West, who had been an upper-class Boston man in 1887, but has awakened from a hypnotic sleep in the year 2000. Dr. Leete, a historian, revived West and serves as his guide to the strange new world of the future. Most of the novel transpires in a question-and-answer dialogue between West and the Leete family. The Leetes explain to him that society has changed so dramatically in 113 years because individuals and corporations alike have unanimously embraced Bellamy's secular religion of solidarity and begun working together for the common good, albeit a common good that still prioritizes individual autonomy if not individual gain. In Bellamy's utopia, all able-bodied men and women work in the "industrial army" in the vocation of their choice from the ages of twenty-one to forty-five, and each receives the same annual income, regardless of gender. As

a result, there is no longer an economic incentive for women to marry.[35] In the futuristic utopia Bellamy creates in *Looking Backward*, economic equality is the precondition for independence and for sexual autonomy; indeed, the two go hand-in-hand. In a world where money was not a precondition to marriage, Bellamy felt convinced that women would select only the wisest, kindest, and most healthy mates, and in turn produce superior children. If they found no men who met their standards, women could simply remain single since they could support themselves financially.

The narrator West also spends time with Leete's adult daughter, Edith, and he is struck by the differences between Victorian women and women in the year 2000, as well as by the vast changes in courtship and marriage practices that he observes. Dr. Leete speculates that in West's time women's economic dependence on men must have "remained humiliating" to "spirited women."[36] West concurs: "The root of [woman's] disability, as you say, was her personal dependence upon man for her livelihood, and I can imagine no other mode of social organization than that you have adopted which would have set woman free of man, at the same time that it set men free of one another. I suppose, by the way, that so entire a change in the position of women cannot have taken place without affecting in marked ways the social relations of the sexes."[37] West expresses interest in learning more about the ways in which the sexes relate when one is not dependent on the other, but it is hard for him to understand how heterosexual relationships can be formulated in such a context. Leete explains that the most marked characteristic of the new egalitarian relations between men and women is their "entire frankness and unconstraint" because, with the economic aspect of marriage removed, they can now "meet with the ease of perfect equals, suitors to each other for nothing but love." West gradually begins to put the pieces together, surmising, "And so the girls of the twentieth century tell their love." He further observes: "One result which must follow from the independence of women, I can see for myself. There can be no marriages now, except those of inclination." Leete affirms that yes, female economic independence has had an unparalleled impact on marriage and society, even in only a few generations: "for the first time in human history the principle of sexual selection, with its tendency to preserve and transmit the better types of the race, and let the inferior types drop out, has unhindered operation." He continues, "The necessities of poverty, the need of having a home, no longer tempt women to accept as the fathers of their children men whom they neither can love nor respect. Wealth and rank no longer divert attention from personal qualities." As a result of the economic and reproductive autonomy of women, people are happier, workers are more efficient, citizens coexist in harmony, and babies are born healthier and stronger. As Bellamy describes, unfettered sexual selection allows for "every generation [to be] sifted through a finer mesh than the last."[38]

While Bellamy does not use the phrase "female choice" in *Looking Backward*, he

emphasizes that women, not men, are principally responsible for selecting sexual partners and that this selection pressure has succeeded in creating a superior type of man. In his utopia, women choose mates based on their natural instincts, and they select "those who have risen above their fellows by the solidity or brilliance of their services to humanity."[39] Dr. Leete explains that "all the encouragements and incentives of every sort which we have provided to develop industry, talent, genius, and excellence" have paled in comparison to the impact on young men of knowing that "our women sit aloft as judges of the race and reserve themselves to reward the winners."[40] Or, as Bellamy explained in an 1891 article in the *Ladies' Home Journal*, in the year 2000 no bachelor could sit idly by knowing that economic necessity would ensure him a wife: "No longer profiting by the effect of the pressure of economic necessity upon woman, to make him indispensible, but dependent exclusively upon his intrinsic attractions, instead of being able to assume the fastidious airs of a sultan surrounded by languishing beauties, he will be fortunate if he can secure by his merits the smiles of one. In the year 2000 no man, whether lover or husband, may hope to win the favor of maid or wife save by desert."[41]

As a result of women's desire to seek only "the best and noblest of the other sex," society has markedly improved in only a few generations. While Bellamy's utopia certainly contains eugenic elements, he stops short of advocating eugenics. He rejects any sort of government or institutional control of reproduction and instead believes that education and social pressure will compel women to select only the best possible mates. Furthermore, Bellamy's interest in planned reproduction prioritizes the interests and autonomy of women, not the number or fitness of future offspring. Indeed, children do not feature in his novel. There are no child characters, and little discussion of children, their traits, or child care. Tellingly, the model family of 2000, the Leetes, have only one child, Edith. Throughout the novel, Bellamy devotes far more attention to the individual and social reforms made possible by female economic independence than to any discussion of improvements to offspring.

According to Bellamy biographer Sylvia Bowman, women's lack of professional options and dependence on marriage for economic survival had long been a concern of Bellamy. Bellamy was an early supporter of women's suffrage and wrote about the perils of marriage by economic necessity as early as 1873.[42] Sylvia Strauss further notes that Bellamy was strongly influenced by his good friend Thomas Wentworth Higginson, the Civil War hero, abolitionist, and women's rights activist. Like several of the most progressive women's rights activists—most notably Elizabeth Cady Stanton, who occasionally referred to marriage as legalized prostitution—Bellamy cited marriage practices as especially pernicious to women and society as a whole.[43] According to Bowman, "Bellamy was opposed to loveless marriages that were made for economic or social reasons because they interfered with the working of Darwin's theory of natural selection and because women,

if they were not to be a torment to themselves and others, should marry those they loved—and so should men if they sought sympathy, companionship and helpfulness from their wives."[44] Bellamy's concerns about loveless marriages and economic inequality came to fruition and international acclaim with the publication of *Looking Backward* in 1888.

In *Looking Backward*, however, Bellamy stops short of advocating fully feminist positions. For example, the women are organized into a separate unit of the industrial army and their female leader is not eligible to be president. The women of Boston in 2000 still wear feminine garb and, compared to the male characters, the main female character, Edith Leete, is not very well developed. It is unclear what her job is in the industrial army, and her father describes her as an "indefatigable shopper," even though there is really only one store to go to.[45] Furthermore, she and her mother (who is not given a first name in the book) leave the room whenever Dr. Leete and West engage in a serious conversation, as may well have been the custom in Bellamy's Boston of the 1880s.[46] When West eventually, and inevitably, falls in love with Edith, he describes her only in aesthetic terms and as possessing stereotypically feminine charms, using phrases such as "in the first blush of womanhood," "the most beautiful girl I had ever seen," "radiant," "blushing," "beautiful," and she is an "angel" whose figure is "faultless[ly] luxurian[t]."[47] In *Looking Backward*, Bellamy suggests that female economic independence and selection of mates have fundamentally improved society, but selecting a mate is pretty much all the main female character in the novel gets to do.

Bellamy initially thought women could not fully take part in his Nationalist movement, as Sylvia Strauss has established, because he considered them too beholden to organized Christianity, which he believed to be a stultifying influence.[48] But the publication of Elizabeth Cady Stanton's *Woman's Bible* (1895, 1898), which analyzed and rewrote all biblical passages pertaining to women from a feminist perspective, convinced him that perhaps women too were capable of bold, anticlerical thought.[49] In *Equality* (1897), the sequel to *Looking Backward*, Bellamy develops Edith more fully and articulates in greater detail what the Nationalist revolution has meant for women. For starters, women get to wear pants, and Bellamy devotes an entire chapter to the follies of nineteenth-century fashion. Narrator Julian West describes seeing Edith walk while wearing pants as "a revelation of the possibilities of an athletic companionship which was not a little intoxicating."[50]

Bellamy also expands on the courtship of Edith Leete and Julian West and uses their relationship to illustrate how a marriage of equals might transpire. Convinced that he wants to marry Edith, West goes to the store to purchase a "betrothal ring," which immediately alerts the clerk that he must be none other than the famous time-traveling Julian West because "nobody in America but just yourself would ask for finger rings."[51] Curious about the demise of jewelry, including but not limited to engagement rings, West asks Dr. Leete for more information on this strange

phenomenon. Leete explains that in West's day, women had paid too much attention to fashion and men not enough, whereas now the situation has equalized, and both sexes are more attractive as a result. Since men's "economic superiority to women [has] disappeared," Leete elaborates, men now have to "depend wholly upon personal attractiveness if they would either win the favor of women or retain it when won."[52] And since both men and women have economic independence and sexual autonomy, women no longer take their husband's names and children assume the surnames of the mother or father according to sex.[53]

In *Equality*, Dr. Leete explains to West that history has shown that the major shortcoming of the nineteenth-century women's rights movement was not considering economics as a key factor in women's oppression. Eventually, as the great revolution unfolded, women realized that their struggle was the same as that of laborers in a capitalist system: "What the women were after was independence of men and equality with them, while the workingmen's desire was to put an end to their vassalage to capitalists. Now, the key to the fetters the women wore was the same that locked the shackles of the workers."[54] West immediately grasps the significance of the revolution for women, observing that "when the women once fairly opened their eyes to what the revolutionary programme meant for their sex by its demand of economic equality for all, self-interest must have made them more ardent devotees of the cause than even the men."[55] While Bellamy's description of women as, more or less, one class of laborers prevents him from fully analyzing gender inequality, West's observation accurately reflects the demographics of Bellamy's own Nationalist movement, in which women outnumbered men.

As Mari Jo Buhle reveals in her classic study of American women socialists, Bellamy's Nationalism particularly appealed to female reformers who often felt excluded from the masculinist rhetoric and strategies of the Socialist Labor Party and who may have been reluctant to affiliate with immigrants and members of the working class.[56] In contrast, Bellamy offered an appealing, middle-class brand of socialism, and his Nationalist clubs were organized in ways that were familiar to the many women who belonged to women's clubs and reform societies in the late 1800s.[57] By 1891, there were over 160 Bellamy clubs to which women contributed a large proportion of members and leaders. The connections between Nationalism and the women's movement can especially be seen in California, where numerous Bellamy clubs flourished, and in Boston, where the first Bellamy club was founded. In Boston, prominent women—including Frances Willard, the powerful president of the Woman's Christian Temperance Union, and Lucy Stone, the editor of the leading women's suffrage newspaper, the *Woman's Journal*—joined with reform-minded men to create the first Bellamy club and popularize Nationalism.[58]

Even though Bellamy allowed alcohol in his utopia, the temperance leader Willard became an ardent Nationalist, largely because of the role that women played in his future society. After reading *Looking Backward*, Willard declared

that it must have been written by "Edwardina" because only "a great-hearted, big-brained woman" could have imagined such a story.[59] Female readers also appreciated that women and men serve (almost) equally in Bellamy's future industrial army; that women's year-long maternity leaves are supported by the state, not by their husbands; and that collective kitchens and day cares have replaced the need for individual women's domestic labor. Women, as Buhle asserts, recognized their goals in *Looking Backward* not because Bellamy first articulated them but because he effectively parroted them back, after having familiarized himself with women's suffrage and other women's rights platforms during his career as a journalist. According to Buhle, "hundreds of women took their first steps in becoming a motive force for Socialism" as a result of reading *Looking Backward*.[60]

American women socialists also became among the most vocal champions of female choice, a reform for which they found inspiration and support in Bellamy's utopia. These women, much more so than male socialists, were drawn to reformist readings of evolution and to the possibility of using science for social change. According to Mark Pittenger's research on evolutionary thought in U.S. socialism, male socialists tended to embrace the conservative tenets of evolutionary theory and use science as a way to justify the status quo and, in particular, the outsider status of women and African Americans.[61] To female socialists, however, evolutionary science offered an appealing alternative to the status quo by redefining the "natural" and women's role in it. Between 1901 and 1915, socialist women spoke and wrote about the implications of evolutionary science—most often *The Descent of Man* and the work of sociologist Lester Frank Ward—in the periodical *Socialist Woman*. Indeed, the very first issue of the *Socialist Woman* included a note instructing subscribers to "Read Darwin's 'Descent of Man.' It will give you a pretty good idea of the part the feminine principle has played in the animal kingdom."[62]

Female socialists believed that the evolutionary history of humanity revealed the prominent role that mothers had once played in reproductive relationships and that evolutionary science suggested that women should regain this power. Articles in the *Socialist Woman* decried economic marriage, criticized the role of the church and state in regulating marriage, and often compared marriage to prostitution. For solutions to the marriage problem, these women writers looked to the animal kingdom and Darwinian sexual selection. As Sara Kingsbury noted in "The Lady-Like Woman: Her Place in Nature" (1908), the modern lady-like woman "violates the habit of every other female in the animal kingdom. . . . She is the only female in the animal kingdom who seeks to charm the male." She then observed that "Darwin, in his 'Descent of Man,'" had established the natural pattern of courtship whereby males must earn access to females: "In the animal world there is no economic dependence on the part of the female to drive her to accept the advances of the amorous male, whether she desires them or not." Kingsbury ended on a hopeful note, however, observing that "there are those of us who are awakening.

We have science for an ally."[63] The woman who did the most to popularize the feminist potential of Darwinian sexual selection was a Bellamy disciple who went on to become the most influential American feminist thinker of the early twentieth century: Charlotte Perkins Gilman.

FEMALE CHOICE IN CHARLOTTE PERKINS GILMAN'S UTOPIA

When Charlotte Perkins Gilman left her husband and moved with her daughter to California to start a new life in 1890, she joined a Nationalist club, published her very first article in a Nationalist periodical, and became one of the movement's most popular speakers, demonstrating again the strong pull that Bellamy had on women reformers.[64] During her time with the Bellamy movement, Gilman developed the ideas that she elaborated in *Women and Economics: A Study of the Economic Relation between Men and Women as a Factor in Social Evolution* (1898), most notably the connection between women's economic and reproductive autonomy. To Gilman, the loss of female choice among humans sealed women's status as subservient and stood out as perhaps the single greatest barrier to women's emancipation. To remedy the situation, Gilman argued time and time again throughout her prolific career that economically independent women needed to be able to freely choose their sexual partners as a prerequisite to any meaningful societal change and as a "natural" solution to many pressing social problems. While she was inspired by the work of Bellamy and first came to prominence through Nationalism, Gilman articulated a much more refined and informed position on the importance of female choice in her many essays, poems, books, and novels. Throughout Gilman's massive oeuvre, female choice provided the foundation upon which all her other reforms rested. To Gilman, women's free choice of sexual partners could only happen when women were economically self-sufficient—otherwise, a tinge of economic incentive would always mar women's otherwise natural instincts—but her case for female choice was biologically as well as economically motivated.

Gilman attempted to paint a picture of the kind of world that would result from the conscious resumption of female choice in her first utopian novel, *Moving the Mountain* (1911), which was followed by the sequels *Herland* (1915) and *With Her in Ourland* (1916). Gilman was drawn to the utopian genre by Bellamy's *Looking Backward*, and she borrowed many of the utopian conventions he pioneered.[65] For example, Gilman uses Bellamy's time strategy, rather than space, to set her utopia in *Moving the Mountain* in the not-too-distant future. And, like Bellamy, the main engine of change in her utopia is economically independent women freely selecting their marriage partners. Most scholarly attention has focused on Gilman's *Herland*, but it is in *Moving the Mountain* that Gilman explores what a

future feminist utopia might look like in the familiar United States, as opposed to the mythical land of *Herland*.[66]

Gilman places the narrator of *Moving the Mountain*, John Robertson, as a stranger in the unfamiliar near future, much like Julian West in *Looking Backward*. Robertson went missing in Tibet from 1910 until 1940. By happenstance, his younger sister Ellen, called "Nellie," finds him in a remote village and brings him home to New York City. Upon his return to the United States, Robertson is shocked by the tremendous changes in American society and in his own family, which have taken place in just a few decades. For starters, Nellie serves as a college president, women and men both wear trousers, and women and men work in whatever careers they choose—including even civil engineering. Robertson repeatedly expresses bewilderment regarding these confusing new gender roles, wondering aloud where the women have gone and how, for example, a pretty young woman could become an engineer.[67]

In 1940, American society is "Beyond Socialism" (mirroring Gilman's own intellectual journey from Nationalism to Fabianism, and beyond), and it practices an amorphous "new religion" emphasizing science, productivity, happiness, and logic, which echoes Bellamy's religion of solidarity.[68] At the heart of these vast societal changes, according to the protagonist's brother-in-law Owen, is

> the wholesale acceptance and application of the idea of evolution. I don't know which to call more important—the new idea, or the new power to use it. When we were young, practically all men of science accepted the evolutionary theory of life; and it was in general popular favor, though little understood. But the governing ideas of all our earlier time were so completely out of touch with life. So impossible of any useful application, that the connection between belief and behavior was rusted out of us. Between our detached religious ideas and our brutal ignorance of brain culture, we have made ourselves preternaturally inefficient.[69]

The most important "useful application" of evolutionary theory that the inhabitants of Gilman's New York have adopted is allowing women to fully develop themselves as economically independent humans so that they can, in turn, select the best mates for themselves or remain single if no suitable mates present themselves. As Owen explains, "A wife used to be a possession." In this new world, "she does not belong to anyone in that old sense. She is the wife of her husband in that she is his true lover, and that their marriage is legally recorded; but her life and work does not belong to him."[70] Moreover, women no longer engage in domestic work since it has all been professionalized and outsourced, and women not only keep their own last names, they also pass them on to their daughters, much like in Bellamy's Boston of 2000.[71]

Naturally, these independent, fully developed women have higher standards

regarding spouses than their nineteenth-century predecessors, who had decidedly fewer options. As a result, they wield the power of selection not only to build happier unions, but also to create better men. Upon learning that men no longer use tobacco, drink alcohol, or hunt, Robertson, incredulous, asks how such seemingly intractable problems could have been eliminated in just a few decades. His sister replies that women simply refused to marry men who smoked, drank, or hunted (earlier, she had explained how venereal disease was stamped out in a similar fashion). Shocked, the narrator exclaims, "you women are trying to make men over to suit yourselves." "Yes. Why not? Didn't you make women to suit yourselves for several thousand years," replies his sister. "You bred and trained us to suit your tastes; you liked us small, you liked us weak, you liked us timid, you liked us ignorant, you liked us pretty—what you called pretty—and you eliminated the kinds you did not like."[72] Whereas male choice of mates had perverted the evolutionary process and created generations of weak women, female choice promises to build strong women and men and create a more healthy future. According to Gilman, all that is needed to reform society from the individual level to the national level is simply for women to decide to apply the evolutionary law of female choice.

While *Moving the Mountain* can be read as a eugenic novel (indeed, several passages discuss the weeding out of undesirable traits through conscious female selection), Gilman justified the changes in mate selection in terms of the benefits to existing women, rather than the benefits that might accrue to future children. Like Alfred Russel Wallace and Edward Bellamy, she seemed to reject the elitist, authoritarian, and racist elements of formal eugenics and instead supported a system that prioritized the needs and autonomy of women.[73] As the heroine of *Moving the Mountain*, the college president Nellie, explains, "the world has come alive. We are doing in a pleasant, practical way, all the things which we could have done, at any time before—only we never thought so. The real change is this: we have changed our minds."[74] The "chief factor" in the change, according to Nellie, is not eugenics but the "individuation" of women: "We individualize the women—develop their personal power, their human characteristics—and they don't have so many children." In response to John's concerns about falling birthrates, Nellie clarifies, "the birth-rate was for women to settle—and they have."[75] Rather than talk of limiting or promoting childbirth in terms of state or official programs, Gilman prefers to think about reproductive decisions in personal terms—if women are free to choose, they will have as many or as few children as they can healthfully support. Much like Bellamy's utopia, there are no child characters in *Moving the Mountain*, and the families that are profiled have two or fewer children. In *Moving the Mountain*, the future belongs to individuated women, not to a new race of improved babies.

Bellamy too relied on social pressure and education to encourage women to

make smart marital choices, but he seemed limited in his ability to fully comprehend what it might mean for women to be "individuated" and reproductively autonomous. In keeping with his commitment to individual freedom in a socialist society, Bellamy, like Gilman, did not recommend how many children should be born to each couple, but he indicated that most couples would choose to limit the number of offspring. In response to concerns by Malthusians that his system would promote overpopulation, Bellamy explained that women and men in his utopia had been educated beyond sexual urges and had many activities in which they would rather engage than sex and child-rearing, which would naturally limit population growth. As further proof, he cited the fact that most wealthy families of his day had few children.[76] But he did not elaborate on the sorts of things a woman liberated from home and child care might accomplish. He was also rather quiet about the details of child-rearing, whereas Gilman wrote extensively about the professionalization of child care in *Moving the Mountain*, proposing, for example, the creation of a Child Culture Department and certificates that all prospective mothers had to receive.[77] Bellamy's relative silence on women's role in his utopia was likely due to the fact that he considered women to be, more or less, another class of disgruntled laborers under capitalism whose problems could all be solved by a change in the economic system. Gilman, on the other hand, strove to articulate how women's individuation would fully revolutionize the nation, and she drew explicitly on evolutionary science, as well as economics, to explain how this change might be accomplished.

Gilman knew from firsthand experience that women's oppression went deeper than economics and that they were more than simply one class of laborers under capitalism. In addition to socialism and Nationalism, Gilman drew explicitly on Darwinian sexual selection and on the work of sociologist Lester Frank Ward in describing her feminist utopia. Ward was the first president of the American Sociological Association, a longtime federal government scientist, and one of the era's "most brilliant and unconventional thinkers."[78] He is best known for popularizing reform Darwinism, an evolutionary sociological system that was in stark contrast to the system of Herbert Spencer and the American Social Darwinists, led by William Graham Sumner. Whereas Social Darwinists lobbied to abandon the poor and let only the fittest survive, Ward suggested that what made humans "human" was their ability to care for one another, change their environment, and shape the future. As part of the reformed future that Ward imagined, women would play a much larger role in society, including in the labor force. Ward believed that it was natural for women to play an equal role with men in all realms of society and that cultural constructs, specifically religion and patriarchal marriage, had kept women from their rightful place for much of recorded history. Taking the long view of history made possible by evolutionary science and geological discoveries

revealed another possible prehistory to Ward, a past in which women and mothers reigned supreme. Such a schema strongly appealed to Gilman, and she frequently referenced Ward in her writings, including in *Moving the Mountain*.[79]

Furthermore, Gilman believed that women's economic dependence on men was not just a personal problem for individual women; she believed it was also a biological problem that stalled evolutionary progress for the human race. To establish this point, she drew on Ward's "gynaecocentric theory," first presented in an 1888 article in the *Forum* and later elaborated in *Pure Sociology* (1903) and other works.[80] In assessing recent scientific pronouncements about gender, Ward was surprised that "those who start out avowedly from a Darwinian standpoint should so quickly abandon it and proceed to argue from pre-Darwinian premises."[81] How could a theory based on reproduction deny the principal reproducers the lead role? And, if scientists did in fact embrace human-animal kinship, why should women's lives differ so drastically from men's when such gendered distinctions did not characterize other animal species? To answer such questions, Ward posited that "androcentrism"—by which he meant male supremacy—was a relatively new phenomenon. Drawing on his interpretation of *The Descent of Man*, Ward contended that women had controlled sexual relations throughout many eons of human existence on earth, only to be supplanted when men—who had been made larger and stronger than women as a result of generations of female selection—realized how paternity worked and began to suppress women in order to be sure which offspring were theirs. Ward's gynaecocentric theory of history sought to establish that "in the economy of nature the female sex is the primary, and the male a secondary element. If this be a law, its application to the human race is readily made and its importance to social life cannot be ignored."[82] One key way to restore female primacy was to reinstate female choice of sexual partners, though Ward did not elaborate on what exactly would enable women to freely choose. Gilman did.

Through her exchanges with Ward, Gilman developed her signature contribution to feminist thought: that women had to be understood as a "sexuo-economic" group. By this, she meant that women's subordinate economic and sexual status were connected and reinforced through marriage—and only by reforming both marriage and the economy could women be free.[83] Not only did Gilman reject the assumption that she borrowed Ward's theory (she believed their influence on each other was symbiotic), she also disagreed with Ward's version of how women lost the power of selection. As Judith Allen explains in her intellectual biography of Gilman, Ward believed that men had taken away the power of selection through violence and rape whereas Gilman did not depict women as victimized. Rather, she focused on the economic elements of their subservience and their limited professional options.[84] To Gilman, the economic aspect of marriage, more than the sexual, was the fundamental problem revealed by male choice of mates, and in turn it was an essential part of the solution. Bellamy too understood this linkage, but his

ingrained ideas about women and his cursory knowledge of evolutionary science prevented him from fully realizing what female choice might mean for women and for society more broadly. In linking economics with marriage, Gilman etched out a distinct difference between her version of "gynaecocentrism" and Ward's, and by paying close attention to sexual selection theory she also distinguished her reforms from Bellamy's more vague invocations of female choice.

To Gilman, the loss of female choice reigned as "the great fundamental error of the Androcentric Culture" and the root cause of women's subsequent degradation.[85] A post-androcentric world, Gilman believed, would be brought about through the restoration of female choice. Most scholarly analyses of the impact of evolutionary theory on Gilman either do not distinguish between the varieties of evolutionary theory circulating in America or tend to focus on the influence of the social evolutionary theories of Herbert Spencer, but my research suggests that Gilman was strongly influenced by Darwin, the author and main proponent of female choice, or at least by Darwin as interpreted by Ward.[86] As early as 1898, the year after Bellamy published *Equality*, Gilman launched her sustained critique of male selection and the society that had resulted from this perversion of nature. In *Women and Economics*, Gilman argued that women had become too feminine in their attempts to attract mates; this "over-sexing" of women thwarted not only individual development but also race progress. To correct this, society would have to rethink the social construction of marriage, the family, and the home. At the heart of the problem that Gilman identified in *Women and Economics* was the "sexuo-economic relationship"—her term for the fact that the only way most women could support themselves was through marriage. Thus, women were forced to look and behave however men liked if they wanted to survive. Comparing human domestic relations to those of animals, a Darwinian strategy, Gilman pointed out that "we are the only animal species in which the female depends upon the male for food, the only animal species in which the sex-relation is also an economic relation."[87] Such unnatural dependence and exaggeration of sex differences, she asserted, led to many social and political problems, including high rates of infant mortality, unhappy marriages, and prostitution. Bellamy said many of the same things, especially in the chapter "What the Revolution Did for Women" in *Equality*, but he stopped short of linking these societal ills so explicitly to evolution. To Gilman, women's economic dependence on men was primarily an evolutionary problem.

As Gilman explained in *The Man-Made World; or, Our Androcentric Culture* (1911), the loss of female choice impaired both natural and sexual selection.[88] She argued that under the "proprietary family" established by men, women were sheltered and not able to participate in the struggle to survive, and they did not get a chance to develop important traits, impairing natural selection. Furthermore, since men lacked discernment in partners, male choice also hampered sexual se-

lection because any man—not only the best men—could mate when all women needed men to survive. "If there is a race between males for a mate—the swiftest gets her first," explained Gilman, "but if one male is chasing a number of females he gets the slowest first. The one method improves our speed: the other does not."[89] Furthermore, man "was not designed to do the selecting. Under his fostering care we have bred a race of women who are physically weak enough to be handed about like invalids; or mentally weak enough to pretend they are—and to like it."[90] To Gilman, male choice of partners perverted the evolutionary process because men selected women according to their "femaleness," not according to their overall "fitness" as humans.

Paraphrasing Darwin in *The Descent of Man*, Gilman explained that in the state of nature, natural selection served as a check against excessive sexual selection. The peacock's tail could never become too bright or too big, for example, because a gigantic tail would impede the individual's survival. Among humans, however, Gilman contended that natural selection now worked in accordance with sexual selection because women depended on men for food.[91] For women, men *were* the environment. Rather than check excessive sexual differentiation, natural selection promoted it, ensuring that the most feminine, and often the most frail, women were those most likely to marry and thus survive. This was dangerous, Gilman suggested, because these women were "too female for perfect motherhood!" The weakest, least self-sufficient women were the ones most likely to marry and the least likely to produce strong, healthy offspring. As Gilman reasoned, "the more absolutely woman is segregated to sex-functions only, cut off from all economic use and made wholly dependent on the sex-relation as a means of livelihood, the more pathological does her motherhood become."[92] Here, Gilman inverted the path etched by male evolutionists, including Darwin, in which the species with the most differentiated sexes were the most advanced. Instead, Gilman argued that excessive sex distinction led to "morbid excesses" in sexual attraction and stymied progress.[93] True evolution happened when men and women advanced together as humans and as equals.

Gilman focused on female dress as the prototypical example of the absurdity of male choice among humans. She was so concerned about the dangers of women's frivolous dress and the excesses of male choice that she published a serial book called "The Dress of Women" in her magazine, the *Forerunner*, in 1915. There, Gilman charged that a major problem with society was that humans exaggerated sex differences and underestimated commonalities—"and nowhere do our errors on this subject speak more loudly, show more clearly than in dress." According to Gilman's keen observations, men often referred to women as "a skoit" or even "a rag," demonstrating beyond the shadow of a doubt that the main purpose of women's dress was excessive "sex distinction."[94] Indeed, dress reform was a popular

turn-of-the-century movement, and several reformers described women's excessive decoration as unnatural in evolutionary terms.[95]

Gilman further noted that female sex distinction was a fate without parallel in the animal kingdom, indicating just how unnatural it was for men to do the choosing of sexual partners and demonstrating again the influence of Darwin on Gilman's thinking. "In other races the male, the naturally variable factor, changes and fluctuates as he may, so offering choice to the female; she, the natural selector, thus by discrimination, improving the race," observed Gilman. "But with us we find him doing the choosing, and we find the woman, depending on his favor not only for mating, but for bread, caters to his taste by this admired capriciousness."[96] Unlike woman, man "does not have to be beautiful, or even healthy; he does not have to excel in mind or morals; he has simply to show that he can 'support a wife.'"[97] Gilman dismissed the suggestions that women dressed as they did because of their aesthetic senses or in competition with other women; this latter excuse merely proved her point that women dress for men in a complete reversal of nature's intentions. According to Gilman, "any competent inquiry must make clear the simple facts of, first, the essentially masculine nature of sex decoration; and, second, that our women have become in this sense 'unsexed,' having adopted a male distinction."[98] Men might say they appreciated fitness and common sense in a woman, but the dance cards told another story: "With lip-service they praise the 'common-sense' costume, but with full dancecards and crowding invitations they pursue the highest-heeled, scantest-skirted, biggest-hatted, 'very latest' lady." Humans' inversion of the natural order of sexual selection "cut off all the haughty splendor natural to the male, which should rejoice the hearts both of the man in joyous observation and of the woman in her glad observance." Instead, "now we must bear the sight of women, young and old, degraded from their high estate—the choosing mothers of the world, and instead, in garb and bearing, become themselves the caterers, the exhibitors on approval."[99]

To Gilman, a female seeking male approval was an abomination of both nature and good taste. She suggested that women study any other species of animal they choose to see "the male, always the male, flaunting his superfluous plumage, strutting and crowing, stamping and bellowing, hoping and prancing about, to say nothing of his valorous combat with his rivals, all to attract the attention and win the favor of the observant female. She does not do all this. Never a female in all the world do we see flourishing unnecessary feathers, erecting haughty crests, shaking gay wattles, capering and posturing to attract the attention and win the favor of the male—never one but the Human Female."[100] Gilman seemed embarrassed by her strutting female peers and encouraged women to look to nature, where all a female had to do to attract a suitor was be female. To test whether one's hat (or other clothing, as a matter of extrapolation) fit Gilman's description of sensible,

rather than sensual, attire she suggested that women put their hats on men: "If the hat makes the man look like an idiot monkey she may be very sure it is not a nobly beautiful, or even a legitimate hat. If she says: 'Oh, but it is so cute on me!' Let her ask herself: 'Why do I wish to look cute?' I am a grown woman, a human being. Mine is the Basic Sex, the First, the Always Necessary. I am the Mother of the World, Bearer and Builder of Life, the Founder of Human Industry as well. My brother does not wish to look 'cute' in his hat—why should I?" Gilman predicted that once women realized their true power and regained the role of selector, "there will be nothing in the long period of their subservience upon which they will look back with more complete mortification than their hats."[101]

As a remedy to the excessive sex distinctions exemplified by female fashions, Gilman urged women and men alike to reread their evolutionary theory and learn the truth about female choice, a natural phenomenon that had been unnaturally supplanted by men. In 1912, Gilman published a fable entitled "Improving on Nature" to highlight the necessity of female choice of sexual partners. In this tale, a man awakens Mother Nature to alert her that women are trying to be men. Incredulous, Mother Nature asks to hear from women themselves. She is stunned when in walks "a plump, pink little person; hobbled, stilted, and profusely decorated." Mother Nature asks the woman why she is so little, so meek, and so weak. Each time, the woman answers: "He likes us that way." "I never heard such talk!," exclaims Mother Nature. "What business has he to do the choosing? That is your place, my dear, and has been since you [were] a Cirriped."[102] Gilman's choice of the "Cirriped," more commonly known as a barnacle, as her animal example demonstrates her familiarity with Darwin's work and also seems strategic. Darwin wrote two early books about barnacles and in *The Descent of Man* described male barnacles as living "like epiphytic plants either on the female or the hermaphrodite form, and are destitute of a mouth and of prehensile limbs. In these cases it is the male which has been modified, and has lost certain important organs, which the female possess[es]."[103] In her strategic selection, Gilman establishes that the male does not always dominate in nature and perhaps that patriarchy itself is unnatural.

At the conclusion of Gilman's fable, man protests Mother Nature's command that females choose mates, and Mother Nature responds with a litany of examples of females throughout the animal and insect kingdoms to demonstrate the error of man's ways. In the end, Mother Nature advises women to "develop your brains and muscles; earn your own livings; be bought by no man; and choose the kind with which you wish to replenish the earth. He has created the kind of woman he liked—and a pretty poor job he's made of it. Now do you resume your natural function of choosing—and make the kind of man you like—that is your especial duty to the race." Man again protests, and Mother Nature exhorts him to "go study your biology!"[104] A challenge that Gilman too posed to her readers. Evolutionary theory, especially sexual selection, furnished Gilman with the means to critique ex-

isting social relations from the standpoint of nature, opened her eyes to the world of alternative domestic and sexual arrangements found in the animal kingdom, and provided her with the solution to androcentrism: female choice.

Inspired by Bellamy, Gilman's strategic use of the Darwinian concept of female choice in her first utopian novel and numerous writings reveals the variety of ways in which Darwin's ideas were invoked for social change at the turn of the twentieth century. On the one hand, an examination of female choice in the writings of Edward Bellamy and Charlotte Perkins Gilman confirms the characteristically American interpretation of evolution as teleological progress; on the other hand, these examples demonstrate that Darwinian ideas were invoked for radical as well as conservative political agendas. *The Descent of Man* and sexual selection theory, in particular, appealed to left-leaning reformers, including Gilman and Bellamy, because female choice promised to not only elevate the status of women but regenerate all of society—present and future—by refocusing attention on natural, as opposed to class-based, indicators of health and fitness and by restoring women's natural reproductive autonomy. Though Gilman and Bellamy both based their utopias on the conscious resumption of female choice of sexual partners, their utopias differed according to the priority they placed on the economic versus the evolutionary benefits of restoring female choice. Bellamy was a middle-class socialist first, a supporter of women's rights second, whereas Gilman's overriding lifelong goal was to convince society that women should be considered as "humans," a reform that was only partially about economics.

Analyzing how the Darwinian concept of female choice reverberated throughout reform circles not only reveals another nuance in the American reception of Darwin, it also sheds light on the role that gender played in framing reactions and responses to evolutionary theory. Even though Darwin himself likely would have recoiled from the ways in which female choice was utilized by Bellamy, Gilman, and other feminist socialists, their embrace of the concept testifies to the complex interplay between culture and science and the extent to which this relationship is often a two-way street (as further evidenced by Alfred Russel Wallace's turnaround on female choice among humans). Scholars including Gillian Beer and Bert Bender have written about the influence of Darwin on literary themes and individual authors, but Darwin's literary influence was not limited to innovations in novels; in the cases analyzed here, utopian novels informed by Darwin also influenced movements for social change.[105] The merger of reform Darwinism with utopian fiction enabled Bellamy, Gilman, and their countless readers to imagine what a future characterized by female choice of sexual partners might look like. Beyond imagining a future populated by autonomous women, the Nationalist movement inspired by Bellamy and the many feminist projects spearheaded or inspired by Gilman allowed some of these progressive interpretations of Darwin

to begin to be put into practice. On another level, feminist and socialist calls for a return to female choice in the 1890s and early 1900s occurred at a vital time in the history of reproductive rights, and early birth control advocates—including the pioneering Margaret Sanger, who first came to activism through socialist women's clubs—absorbed the Darwinian idea that from an evolutionary perspective, it was natural for females to choose when and with whom to reproduce.[106]

NOTES

1. As the historian Jackson Lears explains: "Much American thought in the early twentieth century combined the delusion that Darwinian theory underwrote linear human advance with a vague technological determinism." Lears, *Rebirth of a Nation: The Making of Modern America, 1877–1920* (New York: HarperCollins, 2009), 236–37. In her history of Gilded Age America, Rebecca Edwards similarly explains that "for many, evolution was synonymous with progress." Edwards, *New Spirits: Americans in the Gilded Age, 1865–1905* (New York: Oxford University Press, 2006), 153.

2. Among the best books on Darwin in the United States are Jon H. Roberts, *Darwinism and the Divine in America: Protestant Intellectuals and Organic Evolution, 1850–1900* (Madison: University of Wisconsin Press, 1988); Ronald L. Numbers and John Stenhouse, eds., *Disseminating Darwinism: The Role of Place, Race, Religion, and Gender* (New York: Cambridge University Press, 1999); Ronald L. Numbers, *Darwinism Comes to America* (Cambridge, Mass.: Harvard University Press, 1998); Cynthia Eagle Russett, *Darwin in America: The Intellectual Response, 1865–1912* (San Francisco: Freeman, 1976); and Edward J. Larson, *Evolution: The Remarkable History of a Scientific Theory* (New York: Modern Library, 2004). For a study of the nuances of evolution, see, for example, Peter J. Bowler, *The Eclipse of Darwinism: Anti-Darwinian Evolution Theories in the Decades around 1900* (Baltimore, Md.: Johns Hopkins University Press, 1983).

3. For the classic critique of the idea that Social Darwinism characterized Gilded Age culture, see Robert C. Bannister, *Social Darwinism: Science and Myth in Anglo-American Social Thought* (Philadelphia, Pa.: Temple University Press, 1979).

4. For more on Darwin's developing ideas regarding sexual selection, see, for example, Robert Richards, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior* (Chicago: University of Chicago Press, 1987).

5. Charles Darwin, *On the Origin of Species: A Facsimile of the First Edition* (Cambridge, Mass.: Harvard University Press, 1964), 88–89.

6. Charles Darwin, *The Descent of Man, and Selection in Relation to Sex*, 2nd ed. (1879; rpt., New York: Penguin Classics, 2004), 243–45.

7. Darwin, *Descent*, 262–63.

8. For a full-length study of the scientific reception of sexual selection theory, see Erika Lorraine Milam, *Looking for a Few Good Males: Female Choice in Evolutionary Biology* (Baltimore, Md.: Johns Hopkins University Press, 2010). According to Milam, initial scientific skepticism of the theory was mainly due to the fact that naturalists could not accept that animals exercised choice-based behavior.

9. The quote comes from opening comments that Darwin included on a paper by W. T. Van Dyck regarding sexual selection in dogs, which was read at the Zoological Society of London on April 18, 1882, the day before Darwin died. Charles Darwin, "Preliminary Notice," in W. T. [William Thomson] Van Dyck, "On the Modification of a Race of Syrian Street-Dogs by Means of Sexual Selection," *Proceedings of the Zoological Society of London*, no. 25 (Apr. 18, 1882): 367–69, http://darwin-online.org.uk.

10. Darwin, *Descent*, 585.

11. Ibid., 665.

12. Ibid.

13. Ibid., 640.

14. Darwin contrasts the categories of "selected" and "selecter" (*sic*) in *Descent*, 665. Many authors have analyzed Darwin's ideas about women in the context of the Victorian era in which he wrote, generally concluding that Darwinian evolution was infused with cultural ideas about women's "natural" inferiority. See, for example, Fiona Erskine, "*The Origin of Species* and the Science of Female Inferiority," in *Charles Darwin's "The Origin of Species": New Interdisciplinary Essays*, ed. David Amigoni and Jeff Wallace (New York: Manchester University Press, 1995), 95–121; Flavia Alaya, "Victorian Science and the 'Genius' of Woman," *Journal of the History of Ideas* 38 (1977): 261–80; Susan Sleeth Mosedale, "Science Corrupted: Victorian Biologists Consider 'The Woman Question,'" *Journal of the History of Biology* 11 (Spring 1978): 1–55; and Sue Rosser and Charlotte Hogsett, "Darwin and Sexism: Victorian Causes, Contemporary Effects," in *Feminist Visions: Toward a Transformation of the Liberal Arts Curriculum*, ed. Diane Fowlkes and Charlotte McClure (Tuscaloosa: University of Alabama Press, 1984), 42–52. The best and most thorough account of the sexist uses of science in the nineteenth century remains Cynthia Eagle Russett, *Sexual Science: The Victorian Construction of Womanhood* (Cambridge, Mass.: Harvard University Press, 1989). For a full-length study of the ways in which women interpreted Darwinian evolution for feminist purposes, see Kimberly A. Hamlin, *From Eve to Evolution: Darwin, Science, and Women's Rights in Gilded Age America* (Chicago: University of Chicago Press, 2014).

15. "New Publications," *New York Times* (June 1, 1871): 2.

16. "Literary Notes," *Appleton's Journal* 5 (May 20, 1871): 596.

17. "Darwin's Descent of Man," *Old and New* 3 (May 1871): 598.

18. "Darwin on the Descent of Man," *Harper's New Monthly Magazine* (July 1871): 305–7; "Table-Talk," *Appleton's Journal* 5 (Feb. 11, 1871): 174–75.

19. See, for example, Augusta Leypoldt and George Iles, eds., *Lists of Books for Girls and Women and Their Clubs* (Boston: American Library Association, Library Bureau, 1895), 108–11. There is a copy at the Boston Athenaeum. See also "The Aguilar Free Library," *New York Times* (July 5, 1896): 24.

20. For an analysis of feminist uses of evolutionary science (though not female choice) in the turn-of-the-century socialist movement, see Mark Pittenger, "Evolution, Women's Nature, and American Feminist Socialism, 1900–1915," *Radical History Review* 36 (1986): 47–61.

21. For an excellent study of the Wallace-Darwin debates regarding sexual selection, see Milam, *Looking for a Few Good Males*, ch. 1. For other histories of sexual selection theory and its reception, see Helena Cronin, *The Ant and the Peacock: Altruism and Sexual Selection from*

Darwin to Today (New York: Cambridge University Press, 1991); Bernard Campbell, ed., *Sexual Selection and the Descent of Man, 1871–1971* (Chicago: Aldine, 1972), which was published to commemorate the hundredth anniversary of *Descent*; Mary Margaret Bartley, "A Century of Debate: The History of Sexual Selection Theory (1871–1971)," PhD diss., Cornell University, 1994; Kay Harel, "When Darwin Flopped: The Rejection of Sexual Selection," *Sexuality and Culture* 5, no. 4 (Fall 2001): 29–42; and Simon J. Frankel, "The Eclipse of Sexual Selection Theory," in *Sexual Knowledge, Sexual Science: The History of Attitudes to Sexuality*, ed. Roy Porter and Mikuláš Teich (Cambridge: Cambridge University Press, 1994), 158–83. For a primary account of the controversies regarding sexual selection, see George Romanes, *Darwin, and After Darwin*, 3rd ed. (Chicago: Open Court, 1901), esp. ch. 10.

22. Alfred Russel Wallace, "Women and Natural Selection," rpt., *Lucifer the Light-Bearer* 2 (Sept. 15, 1894): 1, and (Oct. 4, 1894): 1.

23. David Stack, *The First Darwinian Left: Socialism and Darwinism, 1859–1914* (Cheltenham, England: New Clarion, 2003), 29.

24. "Natural Eugenics," *Masses* 4 (Sept. 1913): 3.

25. For further discussion of Wallace's change of mind regarding sexual selection, see Martin Fichman, *An Elusive Victorian: The Evolution of Alfred Russel Wallace* (Chicago: University of Chicago Press, 2004), ch. 5. Other Wallace biographers concur that Bellamy inspired Wallace's embrace of socialism and female choice; see Peter Raby, *Alfred Russel Wallace: A Life* (Princeton, N.J.: Princeton University Press, 2001), 255; and Ross A. Slotten, *The Heretic in Darwin's Court: The Life of Alfred Russel Wallace* (New York: Columbia University Press, 2004), 436–38.

26. Matthew Beaumont, introduction to *Looking Backward: 2000–1887* by Edward Bellamy, ed. Matthew Beaumont (New York: Oxford University Press, 2007), vii.

27. Fichman, *Elusive Victorian*, 262.

28. Wallace, *My Life: A Record of Events and Opinions* (Westmead, England: Gregg International, 1969), 2:389, qtd. in Fichman, *Elusive Victorian,* 271.

29. Beaumont, introduction to *Looking Backward*, ix.

30. Dohra Ahmad, *Landscapes of Hope: Anti-Colonial Utopianism in America* (New York: Oxford University Press, 2009), 19–23.

31. Beaumont uses the phrase "public capitalism" in his introduction to *Looking Backward*, xiv.

32. For a critique of Bellamy's utopia and its implications for workers and democracy, see Arthur Lipow, *Authoritarian Socialism in America: Edward Bellamy and the Nationalist Movement* (Berkeley: University of California Press, 1982).

33. Ahmad, *Landscapes*, 29.

34. Ibid., 28–29. See also Beaumont, introduction to *Looking Backward*, xvi.

35. For more analysis of Bellamy's economic system, see Sylvia E. Bowman, *Edward Bellamy*, ed. David J. Nordloh (Boston: Twayne, 1986), 37.

36. Bellamy, *Looking Backward*, 154.

37. Ibid., 155.

38. Ibid., 156–57.

39. Ibid.

40. Ibid., 157.

41. Edward Bellamy, "Woman in the Year 2000," *Ladies' Home Journal* 8 (Feb. 1891): 3.

42. Bowman, *Edward Bellamy*, 102.

43. Sylvia Strauss, "Gender, Class, and Race in Utopia," in *Looking Backward, 1988–1888: Essays on Edward Bellamy*, ed. Daphne Patai (Amherst: University of Massachusetts Press, 1988), 68. See also Sylvia Strauss, *Traitors to the Masculine Cause: The Men's Campaign for Women's Rights* (Westport, Conn.: Greenwood, 1982).

44. Bowman, *Edward Bellamy*, 102. Bowman does not distinguish between natural and sexual selection in her discussion of the impact of Darwinian theory on Bellamy.

45. Bellamy, *Looking Backward*, 58.

46. See, for example, ibid., 133.

47. Ibid., 25, 147, 175. Darwin wrote a chapter about blushing in *The Expression of the Emotions in Man and Animals* (1872), and it is possible that Bellamy was inspired by such descriptions of the evolutionary significance of blushing to include "blushing" not once but twice in his description of Edith.

48. Strauss, "Gender, Class, and Race in Utopia," 75.

49. For a complete history and analysis of the *Woman's Bible*, see Kathi Kern, *Mrs. Stanton's Bible* (Ithaca, N.Y.: Cornell University Press, 2001).

50. Edward Bellamy, *Equality* (1897; rpt., New York: Greenwood, 1969), 54.

51. Ibid., 125.

52. Ibid., 130.

53. Ibid., 139. See also Bowman, *Edward Bellamy*, 105–6.

54. Bellamy, *Equality*, 132.

55. Ibid., 143.

56. Mari Jo Buhle, *Women and American Socialism 1870–1920* (Urbana: University of Illinois Press, 1983), 75–82.

57. Ibid., 77. Lipow further describes the organization of Nationalist clubs in *Authoritarian Socialism*, 126–32. Bellamy intended for the movement to be led by educated members of the middle class, not members of the working class or immigrants. Attendance at meetings was often by invitation only (128).

58. Lipow, *Authoritarian Socialism*, includes a list of women members in 130n37. Buhle also discusses the prominent female members of Nationalist clubs in *Women and American Socialism*, 75–80.

59. "President's Addresses," *Transactions of the National Council of Women*, ed. Rachel Foster Avery (Philadelphia, Pa.: n.p., 1891), 40, qtd. in Buhle, *Women and American Socialism*, 80, 81n.

60. Buhle, *Women and American Socialism*, 75–77.

61. Mark Pittenger, *American Socialists and Evolutionary Thought, 1870–1920* (Madison: University of Wisconsin Press, 1993).

62. "Notes," *Socialist Woman* 1, no. 1 (June 1907): 4. *The Descent of Man* was included on another reading list later that year under "Books on the Woman Question," *Socialist Woman* 1, no. 5 (Oct. 1907): 6. The study group was discussed in "Socialist Women of Chicago," ibid.

63. Sara Kingsbury, "The Lady-Like Woman: Her Place in Nature," *Socialist Woman* (Aug. 1908): 9.

64. For a thorough account of this period of Gilman's life, see Judith A. Allen, *The Feminism of Charlotte Perkins Gilman: Sexualities, Histories, Progressivism* (Chicago: University of Chicago Press, 2009), 43–63.

65. For a discussion of the wide-ranging influence of Bellamy's *Looking Backward* on other turn-of-the-century writers, see Ahmad, *Landscapes*, ch. 1, "Developing Nations."

66. Charlotte Perkins Gilman, *Moving the Mountain*, reprinted in *Charlotte Perkins Gilman's Utopian Novels*, ed. Minna Doskow (Madison, Wis.: Associated University Presses, 1999). Page citations are to the reprint edition.

67. On the ship home to America, the narrator inquires about the young women passengers and is shocked to learn that Miss Elwell, "quite the prettiest woman on board," is a civil engineer. Gilman, *Moving*, 45.

68. Ibid., 50. Throughout her life Gilman identified with various strains of socialist thought—first Nationalism, then Fabianism—and was, thus, familiar with economic arguments about women's subservience. As Allen explains, "the entirety of [Gilman's] feminist analyses presupposed a socialist transformation of work, economy, society, and culture as axiomatic for a human and, thus, postandrocentric world" (*Feminism*, 352). For another detailed analysis of Gilman's, and to a lesser extent Bellamy's, socialist ideas, see Mark W. Van Wienen, "A Rose by Any Other Name: Charlotte Perkins Stetson (Gilman) and the Case for American Reform Socialism," *American Quarterly* 55 (Dec. 2003): 603–34.

69. Gilman, *Moving*, 100.

70. Ibid., 75.

71. Ibid., 67; Bellamy, *Equality*, 139.

72. Gilman, *Moving*, 93–94.

73. The extent to which Gilman should be considered "racist" is hotly debated by modern scholars. For two contrasting takes on this question, see Alys Eve Weinbaum, "Writing Feminist Genealogy: Charlotte Perkins Gilman and the Reproduction of Racial Nationalism," in her *Wayward Reproductions: Genealogies of Race and Nation in Transatlantic Modern Thought* (Durham, N.C.: Duke University Press, 2004), 61–105; and Allen, *Feminism*, 335–47. Allen persuasively argues that charges like those advanced by Weinbaum that Gilman's work must be interpreted as fundamentally racist are, at best, "unhistorical" and, worse, "antihistorical" (344).

74. Gilman, *Moving,* 53.

75. Ibid., 58.

76. As described in Bowman, *Bellamy*, 104–5. She is paraphrasing Bellamy's reply to the Malthusians, Bellamy, "Will the World Be Over-Peopled under Nationalism," *New Nation* 3 (Feb. 3, 1894): 51.

77. Gilman, *Moving*, 76–77.

78. Edwards, *New Spirits*, 19.

79. Ward's theories regarding women are mentioned in Gilman, *Moving*, 74–75, 109.

80. Lester Frank Ward, "Our Better Halves," *Forum* 6 (Nov. 1888): 266–75; and Ward, *Pure Sociology: A Treatise on the Origin and Spontaneous Development of Society* (New York: Macmillan, 1903), ch. 14. For more information on Ward's gynaecocentric theory, see Clifford Scott, "A Naturalistic Rationale for Women's Reform: Lester Frank Ward on the Evolution of Sexual Relations," *Historian* 33 (Nov. 1970): 54–67. See also Clifford Scott, *Lester*

Frank Ward (Boston: Twayne, 1976). For more on Ward's thinking about gender, see Barbara Finlay, "Lester Frank Ward as a Sociologist of Gender: A New Look at His Sociological Work," *Gender and Society* 13 (Apr. 1999): 251–65. For a discussion of Ward as a reform Darwinist, see Beryl Satter, *Each Mind a Kingdom: American Women, Sexual Purity, and the New Thought Movement, 1875–1920* (Berkeley: University of California Press, 1999), 36–37.

81. Ward, "Our Better Halves," 269.

82. Ibid., 266.

83. For another study of socialist marriage reform proposals advanced by Lester Frank Ward, Edward Bellamy, Charlotte Perkins Gilman, Thorstein Veblen, and Theodore Dreiser, see Sondra R. Herman, "Loving Courtship or the Marriage Market?: The Ideal and Its Critics, 1871–1911," *American Quarterly* 25 (May 1973): 235–52.

84. Allen, *Feminism*, esp. ch. 3, "Gynaecocracy and Androcracy."

85. Gilman, *The Man-Made World; or, Our Androcentric Culture* (New York: Charlton, 1911), 52.

86. The scholarship on Charlotte Perkins Gilman is legion—so much so that it is often referred to as "Gilmania." For other analyses of the role of evolutionary theory, though not necessarily female choice, in Gilman's thought, see Carl Degler's introduction to the 1966 edition of *Women and Economics* and Degler, "Charlotte Perkins Gilman on the Theory and Practice of Feminism," *American Quarterly* 8 (Spring 1956): 21–39; Gail Bederman, "'Not to Sex—but to Race!': Charlotte Perkins Gilman, Civilized Anglo-Saxon Womanhood, and the Return of the Primitive Rapist," in her *Manliness and Civilization: A Cultural History of Gender and Race in the United States, 1880–1917* (Chicago: University of Chicago Press, 1995), 121–69; Maureen L. Egan, "Evolutionary Theory in the Social Philosophy of Charlotte Perkins Gilman," *Hypatia* 4 (Spring 1989): 102–19; and Bernice L. Hausman, "Sex before Gender: Charlotte Perkins Gilman and the Evolutionary Paradigm of Utopia," *Feminist Studies* 24 (Fall 1998): 489–510. For an analysis of Gilman's thought in relation to Herbert Spencer's, see Lois N. Magner, "Darwinism and the Woman Question: The Evolving Views of Charlotte Perkins Gilman," in *Critical Essays on Charlotte Perkins Gilman*, ed. Joanne Karpinski (New York: Hall, 1992), 115–28.

87. Gilman, *Women and Economics: A Study of the Economic Relation between Men and Women as a Factor in Social Evolution* (1899; rpt., New York: Harper and Row, 1966), 5.

88. Gilman, *Man-Made World*, 52.

89. Ibid., 30.

90. Ibid., 55.

91. Ibid., 37.

92. Ibid., 182.

93. Ibid., 32–37.

94. Charlotte Perkins Gilman, "The Dress of Women," pt. 5, *Forerunner* 6 (May 1915): 132–38.

95. Bellamy, to a lesser extent, critiqued women's fashion in *Equality*, where women proudly wore pants and comfortable shoes and where he devoted an entire chapter to the folly of women's fashion ("Can a Maid Forget Her Ornaments"). See also Eliza Burt Gamble, *The Evolution of Woman: An Inquiry into Her Inferiority to Man* (New York: Putnam's, 1894), 69–70; and Lester Frank Ward, "The Past and Future of the Sexes," *Independent* (Mar. 8,

1906): 544–45. Social scientists Thorstein Veblen and W. I. Thomas also critiqued female fashions from an evolutionary perspective. See Veblen, *The Theory of the Leisure Class* (1899; rpt., New York: Penguin, 1967); and Thomas, "The Psychology of Women's Dress," *American Magazine* (Nov. 1908): 66. For an analysis of the link between Darwinism and demands for more simple dress, see Valerie Steele, *Fashion and Eroticism: Ideals of Feminine Beauty from the Victorian Era to the Jazz Age* (New York: Oxford University Press, 1985), 148–49.

96. Gilman, "Dress of Women," 137.

97. Ibid., 134.

98. Ibid., 135.

99. Ibid., 137–38.

100. Ibid., ch. 6, "The Hat," 163.

101. Ibid.

102. Charlotte Perkins Gilman, "Improving on Nature," *Forerunner* 3 (July 1912): 174–76.

103. Charles R. Darwin, *Living Cirripedia: A Monograph on the Sub-Class Cirripedia, with Figures of All the Species: The Lepadidæ; or, Pedunculated Cirripedes*, vol. 1 (London: Ray Society, 1851); Darwin, *Living Cirripedia: The Balanidæ; or, Sessile Cirripedes; the Verrucidæ*, vol. 2 (London: Ray Society, 1854); Darwin, *Descent*, 242.

104. Gilman, "Improving on Nature," 174–76.

105. For studies of Darwin's influence on literature, see, for example, Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction*, 2nd ed. (New York: Cambridge University Press, 2000); and Bert Bender, *The Descent of Love: Darwin and the Theory of Sexual Selection in American Fiction, 1871–1926* (Philadelphia: University of Pennsylvania Press, 1996).

106. For an in-depth study of the links between female choice and birth control, see Hamlin, *From Eve to Evolution*.

LYDIA FISHER

American Reform Darwinism Meets Russian Mutual Aid

Utopian Feminism in Mary Bradley Lane's *Mizora*

First published in four installments in the *Cincinnati Commercial* in 1880–81, and then reissued in book form in 1889, Mary Bradley Lane's *Mizora* is a groundbreaking feminist utopia that helps us to understand the ubiquity and various iterations of Darwin's influence in the United States in the final decades of the nineteenth century. *Mizora* is the first significant, all-female utopia written in the United States. As far as we know, Lane, a teacher at a public school in rural Ohio until she married at age thirty-four, had never published anything of consequence before, and was quiet enough about her radical ideas that even her husband had no idea she had written a novel.[1] In *Mizora* she imagined an ideal, advanced, eugenically planned, racially homogeneous, uniformly beautiful, and adamantly scientific society populated exclusively by asexually reproducing women who have discovered the "secret of life" (which makes men biologically unnecessary) and the secret of harmonious community (which makes men's absence imperative).

Darwin's theory of sexual selection held great importance for utopian writings of the late nineteenth century and early twentieth, which period revived the utopian narrative form for the purpose of inspiring readers with their progressive visions of more perfect societies.[2] While Bellamy's *Looking Backward* (1888) is regarded as the work that, in imagining reform as a gradual, evolutionary process made possible by generational improvements over time, revived the utopian novel as a powerful ideological tool in the nineteenth century, the 1881 publication of Lane's utopia predates that of Bellamy's novel. And while Bellamy's novel conforms to the expectation that the utopian novel features "a traveler from the outside world, traditionally a man," who "transcends time and space to visit, witness, question, and come to terms with a new and improved society," *Mizora* is an early example of a feminist revision of that tradition with a female protagonist.[3] More significant, the similarities between Lane's idealized all-women society and that of Charlotte

Perkins Gilman's 1915 utopia, *Herland*—now a classic text for students of American Progressive-era feminism—are too marked to be coincidental. Most notably, *Herland*'s all-female society depends upon the parthenogenic reproduction that Lane's Mizorans discover as "the secret of life" modeled by the earlier forms on Darwin's evolutionary tree, and like *Mizora*, *Herland* entertains eugenics as part of its feminist path to progress. It appears that Gilman must have had some direct or indirect contact with *Mizora*. Lane's novel is thus an important document for tracing the early development of utopian fictions that disseminated the evolutionary thought of nineteenth-century feminist and socialist movements.[4] And *Mizora* is especially interesting in tracing this history for two reasons. First, because it is distinctive in presenting overtly some powerful evidence of the direct importation of Russian socialist evolutionary thought—with its reliance on the notion of mutual aid—into the American scene. And second, because it is quite ambivalent in its contemplation of the political and social implications of the utopian potential of a nation that makes use of scientific knowledge in service to purification and perfection. While, like so many of her era, Lane appears to be deeply invested in the new possibilities promised by humans' developing command of nature through science, *Mizora* proves to be unusually sensitive to the problems and pitfalls of a progressive scientific vision.

Mizora thus functions as a fascinating model of the multiple valences of Darwinian thought that can influence one publication. Since Lane is a rather obscure figure, we only have the one significant text from which we can interpret her cultural influences.[5] Jean Pfaelzer's extensive investigation into Lane's biography produced only basic details about her family relations and various residences, and the knowledge that she copyrighted a second novel, *Escanaba*, of which no other record or evidence can be found. Unlike Gilman, who wrote extensively and about whom we have an exhaustive historical account, we only have *Mizora* to give us clues about what Lane read and with whom she interacted. But her obscurity makes her especially interesting as a figure who demonstrates the powerful and transformative presence of Darwinian thought commonly found among Americans of the late nineteenth century. An uncelebrated schoolteacher from a quiet Ohio town, Lane embraced the evolutionary thought that entered U.S. culture through both socialist and feminist avenues, accommodating specifically American requirements and conditions.

MIZORA, SEXUAL SELECTION, AND FEMINIST REFORM

Mizora participates in the tradition of American feminist works that responded to Darwin's theory of sexual selection. Published only ten years after *The Descent of Man* (1871), Lane's novel evidences the influence of Darwin's analysis of sex difference and reproductive choice in all organisms. Darwin's theory of sexual selec-

tion shaped American feminist and socialist thought from the late 1880s on. His concept of natural selection, when adopted by Social Darwinists and reinterpreted for their cultural purposes, easily supported a relatively ruthless attitude about the salutary benefits of competition for resources (the fittest survive, and the unfit must be sacrificed for the progress of the race). But the theory of sexual selection—the notion that some traits evolve in a species not because they are advantageous for survival in a particular environment, but because they are selected through the agency of individuals' mating choices—appealed to reformers who embraced the notion that all was not random in the evolutionary process, but rather, human beings could contribute to nature's refinements through intelligent acculturating and reproductive choices. This theory brought a wide-reaching sense of power to a great variety of reformists who saw in it the potential to orchestrate all elements of human biology, culture, and social organization.

Having established the evidence for the power of choice in the lower animals with such observations as "In the same manner as man can give beauty, according to his standard of taste, to his male poultry . . . so it appears that in a state of nature female birds, by having long selected the more attractive males, have added to their beauty," Darwin went on to suggest that many of the differences in appearance among human populations were a result of sexual selection—that is, a result of the mating choices of individuals rather than nature's selection of random adaptations that aided the species' survival.[6] Darwin concluded *Descent* with the statement, "Courage, pugnacity, perseverance, strength and size of body, weapons of all kinds, musical organs, both vocal and instrumental, bright colours, stripes and marks, and ornamental appendages, have all been indirectly gained by one sex or the other, through the influence of love and jealousy, through the appreciation of the beautiful in sound, colour or form, and through the exertion of a choice" (*Descent*, 402). Darwin thus explained much of the variety within species groups throughout the natural world as the result of the agency of individuals whose mating choices influenced the direction of evolutionary change.

We can see in Darwin's treatment of human females in *Descent*'s discussion of sexual selection his commitment to Victorian gender ideologies: he distinguishes humanity from other organisms as a fully evolved species that, in moving to a higher level of development, transitioned from sexual selection controlled by female choice to a condition in which females accommodated themselves to the desires of men. He suggests that female choice in humanity is a mark of the less-evolved peoples of the globe, since "in utterly barbarous tribes the women have more power in choosing, rejecting, and tempting their lovers, or of afterwards changing their husbands, than might have been expected" (*Descent*, 372). He thus links male choice to the notion of evolutionary progress and fully realized civilization and appears unwilling or unable to imagine human females exerting the same sort of shaping power over males of their species that female birds enjoy. In addi-

tion to arguing in *Descent* for evolution's creation of men's physical prowess and women's relative constitutional weakness, he concludes that through the differentiating processes of sexual selection "man has ultimately become superior to woman" in his mental capabilities (328).[7] But many of Darwin's contemporaries took his logic a few steps further than he was able to take his theory of selection through choice, which conceived of gender difference—and human character in general—as a product of transformative human agency rather than fixed natures. Even Herbert Spencer, who, at least in his early career, was more of a reform-minded idealist and less of a fatalistic conservative than is commonly believed, innovated on Darwin's rather rigid vision of women's place in human society with his suggestion that societal evolution away from primitive warmongering might produce a "corresponding re-adjustment between the natures of men and women, tending in sundry respects to diminish their differences."[8]

British and American feminists questioned Darwin's conservative and masculinist interpretation of his own data. They asserted that women's difference from men—the results of sexual selection—need not be understood as inferiority, and they also argued that women must claim the agency and evolutionary flexibility that nature provided for them. By conceiving of female choice in sexual selection as a trait of our nonhuman ancestors away from which humans had necessarily evolved in the march of progress, Darwin had robbed women of an important claim to social and biological power, and many of Darwin's female contemporaries wanted to claim such power while still embracing the broader outlines of Darwin's convincing theories.[9] If women's subjection to men's choices became entrenched as an imperative of the highest evolution, women would be trapped in their present position as limited, poorly educated, second-class citizens. Women would have to intervene in the scientific conversation in order to unsettle the conservative gender ideologies that Darwin's theories carried, however revolutionary they might be in their transformation of humans' understanding of themselves in a network of biologically related organisms.

Antoinette Brown Blackwell is one of the key feminist figures who offered such an intervention in the United States. Her exhaustive feminist response to Darwin's *Descent* in her 1875 publication, *The Sexes throughout Nature*, was widely available to American readers, both in book form and in excerpts previously published in the *Woman's Journal* and *Popular Science Monthly*. In this book Blackwell argues against Darwin's misrepresentation of women's intellectual capabilities, and she asserts that, while sexual selection has clearly created some differences in the physical and mental strengths of the sexes, women's differences need not be regarded as deficiencies. Rather, a progressing society must open-mindedly regard any notable differences in women's capabilities as potential assets for the broader community; at the same time, she insists, they are the products of selection and environment, and thus always in flux. She encourages women to exercise their capabilities, for

the greater good of both men and women, beyond their existing domestic limitations, and she also emphasizes the flexibility of women—their potential to progress according to nature's evolutionary mechanisms and thus to aid in the progress of the human race in general. Blackwell writes:

> When [nature] has endowed any woman with special talents, the balanced development of such a character requires the amplest exercise of the predominant gifts. Any prevailing tendency is itself evidence that the entire organism is adjusted to promote its superior activity. If it is a quality, just, honorable, desirable to be obtained by the race, to hinder its highest development is to retard the normal rate of human progress; to interfere unwarrantably with a fundamental law of evolution. No theory of unfitness, no form of conventionality, can have the right to suppress any excellence which nature has seen fit to evolve. Men and women, in search of the same ends, must co-operate in as many heterogeneous pursuits as the present development of the race enables them both to recognize and appreciate.[10]

Blackwell's text would have been readily available to an educated feminist like Lane, and if she did not read Blackwell's book, *Mizora*'s argument indicates that Lane was exposed in some way to the current trends in feminist responses to Darwinian thought. The American botanist, paleontologist, and sociologist Lester Frank Ward, well known for his influence on the feminist theories of Charlotte Perkins Gilman, was already publishing his work in the field of reform evolution—founded on post-Darwinian theories about "the hereditary transmission of culturally and behaviorally acquired characteristics"—by the early 1880s.[11] Ward condemned all forms of sexual segregation in human society, making his assessment of the disadvantages associated with women's limitations in Western societies a central component of his theories that brought together evolutionary thought and social theory.

Lane's novel clearly participates in the debates in the United States about women's capabilities and social role that followed the popular dissemination of Darwin's *Descent*. *Mizora* envisions as superior the human characteristics most readily associated with women: their peaceful, maternal, and nurturing qualities. At the same time the novel asserts that women's capabilities are highly malleable—the product of cultivation through education and selective breeding. Education is of primary importance in Mizoran society, and its members' sophisticated science gives them seemingly limitless powers to shape themselves and their environment. From the first moments of our encounter with this utopian society, Vera Zarovitch, Lane's narrator, challenges the prevailing narrative about women's evolutionarily established character by introducing readers to a land of women that is not virgin territory—nor feminized Nature—waiting to be conquered by man's reason and powerful categorizing pen, which is the common stuff of exploration fantasies. The account of Vera, a Russian noble, begins by presenting readers with an array of societies in

seemingly different stages of social and political evolution. Vera recounts her exile to Siberia in punishment for her radical views (developed in part, she explains, through her regular visits and close intimacy with an American family) and her open denunciation of the violent actions of Russian czarist military forces during a peaceful protest in Poland. Her attempt at escape on the way to her imprisonment in Siberia is complicated by a shipwreck, and as a result Vera ends up sheltering for a time with an Eskimo settlement, where she shares in the "continual struggle with cold and starvation" with the "poor children of the North."[12] This assortment of communities, presented in a teleology of development from the infantilization of the Eskimos to the advanced and admirable republic of the United States, prepares the reader for Lane's introduction of her fully evolved utopia, Mizora.

On her desperate voyage away from the Eskimo community in a small boat in search of "some of my own race," Vera's boat drifts into a strange whirlpool current that takes her to the world of Mizora, under the sea (*Mizora*, 12). There she finds a utopian land peopled entirely by highly sophisticated, intelligent, beautiful, virtuous, and talented women. Vera resides in Mizora for over a decade, learning their language and history, and about their scientific, political, and social advancements, before she makes the decision to attempt a return to her own people.[13] Vera's account of Mizora portrays a model of productive culture—a sophisticated feminine metropolis in which science is the dominating force that has freed women from their oppression and facilitated the march of progress, creating a superior citizenry and the pinnacle of comfortable living. Here, "Science sat throned, the grand, majestic, humane Queen of this thrice happy land" (57). This is a distinctly feminine, late nineteenth-century realization of the promise of science made possible by a programmatic, state-sponsored culture of domestication. With *Mizora*'s evolutionary vision of improvement, Lane offers readers a Spencerian adaptation of Darwinian theories. Where Darwin argued for a chaotic natural world in which biological forms evolved as a result of chance genetic aberrations, Spencer transformed that theory by introducing his own emphatic investment in the notion of advancement through evolutionary change, and his particular interest as a sociologist was in the perfection of the human race and human societies.

In coining the term "survival of the fittest," Spencer shifted away from Darwin's focus on the beauty of random adaptations and gave evolution a sense of purpose: increasing fitness and the "purification" of a species. As Spencer wrote in *The Principles of Biology* (1864), "That organisms which live, thereby prove themselves fit to live, in so far as they have been tried; while organisms which die, thereby prove themselves in some respects unfitted for living; are facts no less manifest, than is the fact that this self-acting purification of a species, must tend ever to insure adaptation between it and its environment."[14] Spencer thus presented in 1864 a vision of inevitable biological perfections through evolution that in *The Principles of Sociology* (1874) he transformed into a theory of the march of civilization. There,

societies would be refined and improved by their adaptations to changing environments, moving away from tyranny to embrace a more evolved form of "peaceful, organicist, functionalist polity."[15] Lane joined many reform-minded Americans in embracing Spencerian adaptations of Darwinian theory to envision salutary social change.

Mizora's realization of the promise of science for a society of women seems to be a direct response to the long history of associations that bound women to nature, associations that gained more powerful ideological grounding in the wake of the publication of Darwin's *Descent*. *Descent* declared that because women's intellect was not subject to the same rigorous forces of competition that shaped that of men, female "mental powers" remained unrefined; they were "characteristic of the lower races, and therefore of a past and lower state of civilization" (*Descent*, 327). Darwin's confirmation of established Victorian gender ideologies helped to generate an influential strain of science focused on the link between female education and women's reproductive capacity in the 1870s and 1880s, characterized by the work of figures like the psychologist Henry Maudsley in England and the physician Edward H. Clarke in America.[16] Using evolutionary logic, Maudsley argued that "there is sex in mind as distinctly as there is sex in body." The organs associated with women's mental and reproductive capabilities had evolved in intimate association, and so any mental strain resulting from a rigorous education would compromise her primary work as a mother.[17] Clarke disseminated these ideas in the United States with his very popular and influential 1873 work, *Sex in Education*, quoting extensively from Maudsley's writings to make the case not only that female education was potentially disruptive to the reproductive role that nature had apportioned to women, but that women's education could interfere profoundly with the natural sex order established by nature's evolutionary processes: "While woman preserves her sex, she will necessarily be feebler than man, and, having her special bodily and mental characters, will have, to a certain extent, her own sphere of activity; where she has become thoroughly masculine in nature, or hermaphrodite in mind,—when, in fact, she has pretty much divested herself of sex,—then she may take his ground, and do his work; but she will have lost her feminine attractions, and probably also her chief feminine functions."[18]

In *Mizora*, Lane rejects the scientific trends in her society that had begun to justify limited access to female education with a focus on women's reproductive capabilities as their primary social identity—an identity that also perpetuated the long tradition of women's status as sexual objects. Lane delegitimizes the androcentric American society available to her and replaces it with her vision of a society of women who are not Nature embodied, but who have directed nature through their scientific knowledge (made possible by a sophisticated education system available to all) to create citizens who, through their dedication to a national code of chastity, appear to have taken absolute control over their own bodies. They are

both accomplished scientists *and* capable mothers, and they are no longer the sexual objects or the reproductive vessels of men, although the contradictions of this apparent self-determination become more evident as the narrative reveals that the state denies reproduction to any woman deemed unfit for that privilege.

This highly controlled chastity of Mizora is emphasized from the first moments of Vera's introduction to it. While clearly invested in the evolutionary narrative of progress through cultivation that Darwin's theory of sexual selection had provided for reform-minded Americans, with her removal of all things animal or earthy from Mizora, Lane, like many of her contemporaries, appears to write in reaction to the implications of Darwinian theory that linked humans closely to their nonhuman ancestors—Darwin's disturbing assertion that "man still bears in his bodily frame the indelible stamp of his lowly origin" (*Descent*, 405). In this perfected society that so powerfully denies the animal in the human and the uncontrolled in nature, Vera first notices the carefully cultivated beauty of the place: the turf on the banks "like a carpet of rich green velvet," the fragrance of fruit from well-tended orchards, and, most notably, the "weird stillness" of a land virtually devoid of nonhuman animal sounds. Birds still sing in the orchards, but, Vera later learns, all other forms of nonhuman animal life have been eliminated as unnecessary. The economical, scientific production of food has made animal husbandry superfluous, and, as one Mizoran woman puts it, "the association of animals is degrading" (*Mizora*, 113). Moreover, Vera explains, invoking the Progressive era's preoccupation with a corrupt food-processing industry, "the absolute purity of all [the Mizoran women ate] preserved an activity of vital power long exceeding our span of life" (26). Mizorans have removed from their food all "deleterious earthy matter," and aside from their fruit, all food is derived from chemical processes rather than agriculture. Food is even cooked in a sophisticated hot air system that allows no odors to escape into living or work spaces (45).

Such recoiling from the animality that would so inspire the American naturalist writers of a later generation was typical of 1870s and 1880s American socialist evolutionism, which emerged from the scattering of reformers who, disheartened by Darwin's natural selection of chaotic, random adaptations, embraced a vision of human cultural and biological progress more akin to Spencer's earliest revisions of Darwinian theory—a vision of inevitable social progress toward peace and social "equilibriation," an "optimistic grand design."[19] As Mark Pittenger has argued, the Shakers' communal project of celibacy in the 1870s exemplifies an early manifestation of socialist evolutionism in the United States and a broader resistance among diverse religious groups to Darwin's exhaustive research into the biological links between humans and other species. According to Shaker belief, "progress . . . consisted in transcending one's biological or animal nature for a higher, spiritual self, dedicated to God and detached from private property."[20] Alternatively, John

Humphrey Noyes's Oneida community, which ran from 1848 to 1880, represents an effort on the part of science-minded reformers to realize a higher form of human society in which the "animal" passions of man could be cooperatively controlled with eugenic planning (Noyes called the community's scientific breeding "stirpiculture") with the end of perfecting Oneida's population as a model of human potential. Contemporaneous with these communal movements, the earliest American proponents of eugenics and socialism, such as Victoria Woodhull and Moses Harman, whose advocacy for innovations in current American breeding practices ventured into the territory of "free love," published their theories beginning in the 1870s.

This free-love contingent of the sexual reform movements in the United States, which were at least in part inspired by the post-Darwinian interrogation of human sexuality and reproduction, also produced the Berlin Heights community of 1865–66, located in Erie County, Ohio, not far from Lane's Ohio home during her early twenties. Lane would have heard of this infamous group of socialists who "offered women sexual autonomy and economic opportunity and thus provoked fear in those who believed freedom and equality for women would destabilize [the U.S. national] order."[21] Lane crafted her own vision of sexual reform, responding to the examples of her contemporaries with a fictional scenario in which science takes control of humans' animal urges to such an extreme that eugenic reproduction is entirely divorced from sexual activity. The Mizorans' rather anorectic relationship to food is thus paired with their absolute sexual abstinence. The women Vera lives with during her stay in Mizora are the product of an evolutionary struggle that began with a troubled society much like the United States of the nineteenth century—haunted by slavery, inequality, corruption, disease, and violence—and ended with the elimination of men as one of the unnecessary animal forms of Mizora. The Mizoran women took over the rule of the nation in a period of extreme instability and "formed a Republic, in which they remedied many of the defects that had marred the Republic of men." When they discovered the "Secret of Life" that would make asexual reproduction possible, they chose to rid their society of males; it had become clear that the "race" of men would forever be a force of violence, corruption, and instability in Mizora's progressing Eden, since "the men were resolved to secure their former power" and "the women looked forward to their former subjugation as only a matter of time" (*Mizora*, 103). In this now fully realized, purified utopia, love among the country's mothers, daughters, and sisters is familial, nurturing, and selfless, *but never erotic*. After Vera recounts for Wauna a love poem she remembers from her former life, Wauna counsels her, "Poor child of superstition. . . . Your belief has something pretty in it, but for your own welfare, and that of your people, you must get rid of it as we have got rid of the offspring of Lust. Our children come to us as welcome guests through

portals of the holiest and purest affection. That love which you speak of, I know nothing about. I would not know. It is a degradation which mars your young life and embitters the memories of age. We have advanced beyond it" (*Mizora*, 130). Lane imagines a society in which women have exerted their selective choice to the extreme of opting for abstinence and thus the elimination of sexual difference from their species. Through their atavistic adoption of parthenogenic reproduction as an alternative to sexual reproduction, they have enacted a structural change in the reproductive mechanisms of their species and affected the path of evolution. *Mizora* thus embraces fully the potential of Darwin's theory of sexual selection, presenting a resolutely feminist interpretation of the theory of female agency that Darwin himself did not willingly cede to human females.

Here, Lane's novel joins the work of many feminists of the late nineteenth century in embracing evolutionary theory as an intellectual tradition through which they might craft an acknowledged place in the march of civilization as mothers and caretakers of the national "home." The novel imagines Mizora's transformation from the barbarism of a society controlled by men to the elevated civilization of a society in which men, the darker races, criminals, and the infirm and deformed have been eliminated. As we learn that this society of strong, beautiful, blonde, and blue-eyed women was made possible by denying the privileges of reproduction to those deemed unfit, we see the clear connection this novel makes between the cultivating, domesticating impulse of the chaste, white, middle-class woman and an apocalyptic, sterile orderliness that eliminates ecological variety, passion, and culinary aromas (*Mizora*, 81). While these racist, eugenic tendencies, which seemed so appealing to many notable white American feminists, are most often blamed on Spencer, we can see that even if such women were exposed exclusively to *The Descent of Man*, Darwin's rhetoric in that work supports notions of racial hierarchy even when the science in *Descent* argues emphatically against the notion of races as a meaningful way of dividing human beings. *Descent* even offers some problematic discussion of the struggle between the races that can implicitly support the notion of eugenics, however opposed to the notion of eugenics Darwin ultimately was—and he was quite opposed. Darwin does write in *Descent*: "At some future period, not very distant as measured by centuries, the civilised races of man will almost certainly exterminate, and replace throughout the world the savage races. At the same time the anthropomorphous apes, as Prof. Schaaffenhausen [*sic*] has remarked, will no doubt be exterminated. The break will then be rendered wider, for it will intervene between man in a more civilized state, as we may hope, than the Caucasian, and some ape as low as a baboon; instead of as now between the negro of Australia and the gorilla" (201). While the science of *Descent* entirely disrupted the concept of race as it was commonly understood in Europe and America—Darwin argued at length that the similarities between the races,

along with the great diversity among individuals in racial groups, indicate that we are not, indeed, a "racial" species, but rather a "polymorphous" species—readers of *Descent* who were looking for scientific support for their own racist anxieties and beliefs readily found material there for their needs. Indeed, as Edward Beasley argues, in spite of his scientific dismantling of the concept of race in *Descent*'s famous chapter on the races of man, Darwin continues to treat the concept of races as a reality throughout the rest of the book, returning again and again to comparisons between "civilized nations" and the "lower races."[22]

What is most interesting about *Mizora* is that Lane's ultimate attitude toward Mizora's science of control is quite unclear. So we can see Lane thinking through in her fiction some of the central questions that evolutionary thought produced for many (even Darwin himself) who brought the scientific support for evolution to bear on their entrenched assumptions about racial difference and racial hierarchy. Lane apparently invests in the narrative of progress enabled by Mizora's emblematic fulfillment of white, middle-class, public housekeeping: we can sense her aesthetic delight in describing the flaxen beauty of the Mizorans; the tasteful, quiet, secure luxury of their clothing, buildings, parks, and gardens; and the cool serenity of their well-regulated and noble interactions with one another. But with her protagonist, Vera, Lane casts into question the legitimacy of Mizora's scientific vision. In the history of this land of women, the tables were turned, and men became the disenfranchised class in retribution for their unwavering desire to subjugate women. The utopian form of this narrative encourages readers to witness the wonderful peace, morality, and prosperity that prevails in a world of women, and thus to see the fictive punishment for a troublesome "race" of men as only just. *Mizora* contemplates the possibilities of a society that encourages female education, values women's contributions, and embraces as doctrine the cultivating ethos of the white middle-class woman. Vera, though, does not fulfill the expectations of the typical protagonist of a utopian narrative who, as Jean Pfaelzer explains in her study of the utopian genre, is usually male and "inevitably naïve . . . deeply critical of his own society, ready to be convinced."[23] While Vera marvels at the prosperity of Mizora and readily acknowledges the superior intellect and achievements of Mizora's citizens, she also, with her dark hair and eyes, her merely human mental powers, and her mortal beauty, cannot help but feel connected to the groups that she learns are now deemed to be the unhygienic progenitors of Mizora's ancient history. Vera ultimately dwells on and stubbornly preserves her connection to those characteristics that the Mizorans have explained to her are best eliminated as disruptive inheritances of an unfortunate, primitive past. In a key scene in the novel, Vera, after a long period of wondering in silence, finds the courage to ask about the absence of men and is taken to a remote gallery in the National College that houses the portraits of the nation's ancient male ancestors. As Vera gazes upon

these portraits of men reaching back to medieval times, she notices that "some had noble countenances; and some bore on their painted visages the unmistakable stamp of passion and vice." She continues:

> It is not complimentary to myself to confess it, but I began to feel an odd kind of companionship in this assembly of good and evil looking men, such as I had not felt since entering this land of pre-eminently noble and lovely women. As I gazed upon them . . . the dark eyes of a debonair knight looked down upon me with familiar fellowship. There was pride of birth, and the passion of conquest in every line of his haughty, sensuous face. I seemed to breathe the same moral atmosphere that had surrounded me in the outer world. *They* had lived among noble and ignoble deeds I felt sure. *They* had been swayed by conflicting desires. *They* had experienced the treachery and ingratitude of humanity, and had dealt in it themselves. *They* had known joy as I had known it. . . . *They* had loved as I had loved, and sinned as I had sinned, and suffered as I had suffered. (*Mizora*, 91)

Vera then notices that many of these portraits feature individuals with dark complexions, and her guide explains, "we believe that the highest excellence of moral and mental character is alone attainable by a fair race. The elements of evil belong to the dark race. . . . We eliminated them" (92).

Vera's response to this seemingly personal assault is significant. She insists:

> In candidly expressing herself about the dark complexions, my companion had no intention or thought of wounding my feelings. So rigidly do they adhere to the truth in Mizora that it is of all other things pre-eminent, and is never supposed to give offence. [She] but gave expression to the belief inculcated by centuries of the teachings and practices of her ancestors. I was not offended. It was her conviction. Besides, I had the consolation of secretly disagreeing with her. I am still of the opinion that their admirable system of government, social and political, and their encouragement and provision for universal culture of so high an order, had more to do with the formation of superlative character than the elimination of the dark complexions. (*Mizora*, 92–3)

Vera's thoughts in this scene become meaningful in light of her explicit admiration of Mizoran society throughout the rest of the novel. She first dwells on her "uncomplimentary" humanity—the tendencies toward passion, pride, and even conquest that put her in league with the detested male despots—but then, having been exposed to the prejudice of this society against "darker" individuals, she asserts her own conviction that this eugenic solution was not the source of Mizora's accomplishments as a nation, and in doing so she implicitly rejects that eugenic logic.

And this brings us back to Lane's vision of a "chaste" land in which scientific truth has served as the justification for the selective, but quite sweeping, elimination of human and nonhuman organisms—public housekeeping in sanitizing

overdrive. With her scientific society of women, Lane presents a challenge to the patriarchal tendency to claim, categorize, and thus silence both women and nature. But what Mizora's feminized science of domestic culture offers in place of masculine domination is still domination and circumscribed justice in a beautiful package. The destabilizing scene in the gallery of portraits, in which Vera, a woman, acknowledges her own desires for conquest, and also voices her doubts about Mizoran scientific conceptions of truth, makes it clear that women too are subject to the temptations of power, and they might wield that imperialist power in some disturbing ways when they take up their reign as the nation's designated cultivators. This scene also hints at the subjectivity of the reified unfit, the manipulated and rejected objects of science—and in this case, their reification is exaggerated by the fact that we only access them, now long dead, through their lifeless portraits in a secluded gallery. When Vera insists upon the overwhelming emotional kinship she feels with the scientifically exterminated elements of Mizora's past, she becomes a voice for the inert portraits of men hanging in the gallery of Mizora's National College. She intervenes in the construction of the nation's scientific truth, and the truth she presents challenges Lane's readers to question the perfection that cultivation creates.

Mizora's narrative thus percolates with the troubling consequences of an ideology of containment. Gazing from the Mizoran shores upon the ocean of whirlpools that separates her from her own comparatively primitive people, Vera realizes, "I felt as a bird might feel who has been brought from the free expanse of its wild forest home, and placed in a golden cage where it drinks from a jeweled cup and eats daintier food than it could obtain in its own rude haunts. It pines for that precarious life; its very dangers and privations fill its breast with desire" (*Mizora*, 115).

American Feminists' Reform Evolution Meets Russian Socialists' Mutual Aid

The convergence of two seemingly aligned but still emphatically distinct iterations of evolutionary thought produces some of the ambivalence in *Mizora*. On the one hand, Lane used her novel to explore the innovative feminist responses to Darwinian thought in the United States; many feminists, by the late 1880s, had embraced a distinctively racist maternalism. White women, pointing to their highly evolved removal from primitive desires and aggressions, argued for their place at the top of the evolutionary ladder, displacing the white men who had assumed that position as a matter of course. Thus, in a characteristic articulation of a maternalist argument for women's right to vote, suffragist Ora Brashere argued, "Judging by the best ethical standards of humanity, those qualities corresponding to mental and moral forces which were bequeathed by the female are to be ranked higher than the predominant propensities of the male." Man's morality and con-

cern for his fellow man was, for Brashere, simply an "extension" of woman's "maternal love."[24] In a more overtly racist/nativist iteration of the argument for white women's social and political ascendancy, feminist leader Elizabeth Cady Stanton fumed that "all orders of foreigners rank politically above the most intelligently, highly educated women—native-born Americans." She defended her rejection of the cause of universal suffrage, insisting, "it is not the principle of universal suffrage I oppose, but . . . the admission of another man, either foreign or native, to the polling-booth, *until woman, the greatest factor in civilization*, is first enfranchised."[25] With such arguments, white women agitating for their rights reinforced the racial narratives that would eventually justify by the early twentieth century the real-life enactment of some of the institutionalized eugenic "improvements" proposed in novels like *Mizora* and Gilman's *Herland*.

On the other hand, Lane also engaged in *Mizora* with a separate strain of evolutionary thought that came to her through her exposure to Russian socialist ideology. A close comparison of *Mizora* and the highly influential utopian political novel *What Is to Be Done? Tales about New People* (1863) by Nikolai Chernyshevsky, a Russian philosopher, journalist, and literary critic, reveals that Lane must have read the novel, most likely through a French translation (first published in 1875), before writing her own utopia. *What Is to Be Done?*, written and smuggled out for publication during Chernyshevsky's imprisonment in the Peter and Paul Fortress for his radical politics, presents a fictional illustration of Chernyshevsky's philosophical materialism and investment in the reorganization of social, cultural, and political structures according to cooperative principles. It inspired young Russian intellectuals working for the overthrow of czarist rule and some of the primary leaders of the Marxist revolution.[26] The central "new people" Chernyshevsky imagines in this novel are Vera Pavlovna and her husband, Lopukhov, a radical, who in marrying her helps her to escape the mercenary marriage plans of her unscrupulous mother. The couple models radical ideals of sex equality and works together to realize a vision of cooperative socialism; ultimately Vera marries another highly enlightened man with whom she falls in love, having been released willingly by Lopukhov, who is more invested in accomplishing women's freedom than in possessing Vera for himself. The novel is punctuated by four dreams in which Vera Pavlovna is witness to the appearance of a goddess, who is variously referred to as "Love for Humanity," "Bride of Her Bridegrooms," and "Sister of Her Sisters."[27] She functions as Chernyshevsky's ideal of absolute understanding and the good, and in her dream appearances she aids Vera in realizing her potential as a fully liberated "new woman." The fourth of these goddess dreams is arguably the most well-known and revolutionary section of the novel. In this dream the goddess takes Vera on a tour of women's place in progressively more sophisticated and increasingly more egalitarian societies throughout history, and eventually brings her to an agrarian utopia made perfect by scientific knowledge.

As Annegret Wiemer has argued, the influence of *What Is to Be Done?* on Lane's *Mizora* is powerfully apparent. Lane adopted for her own utopia many of the modern innovations of Chernyshevsky's dream society—its Crystal Palace, the emblem of the power of science in the utopian future; its free-flowing, Greek-style costumes that allow for lung expansion and thus more musical voices; and its cooperative, technologically advanced, agrarian economy that has almost eliminated human labor. Most notably, Lane's protagonist, the Russian noblewoman Vera Zarovitch, experiences, like Chernyshevsky himself did, imprisonment and exile to Siberia for radical political sentiments; and her name is a significant homage to Chernyshevsky's heroine of the early Russian socialist underground, Vera Pavlovna, who, though privileged, dedicates her life to the realization of an ideal socialist society. Even more important, Vera Pavlovna's fourth dream seems to have worked as both an ideological and artistic inspiration for Lane. And as Wiemer points out, Lane even seems to have borrowed heavily from specific scenes in *What Is to Be Done?*, replicating many of the details of Chernyshevsky's utopia as a reclaimed Eden, full of birdsong and human singing, verdant landscapes, and accomplished architecture perfected by modern conveniences like electric lighting.[28]

So while we see that Lane wrote from an American society shaped by Darwinian theory—a society of early reform evolutionists and eugenicists—we can also see that her evolutionary thought came through another source as well: the concept of mutual aid that dominated the adaptation of Darwin's ideas for Russian society. Mutual aid is associated most commonly with Prince Petr Alekseevich Kropotkin, a leader of the international anarchist movement and the author of *Mutual Aid: A Factor of Evolution* (1902). This book was the culminating account of Kropotkin's theories, published after he wrote many articles on mutual aid for the British monthly literary magazine the *Nineteenth Century*. Kropotkin's commitment to the topic of mutual aid was a direct response to Thomas Huxley's famous Malthusian and very pessimistic article "The Struggle for Existence" (1888), in which he discussed the competition among organisms in the natural world as like "a gladiator's show."[29] In responding to the work of evolutionists like Huxley and Herbert Spencer, who focused on the competition for survival among the organisms of a single species, Kropotkin, a devoted Darwinist, reflected in *Mutual Aid* upon his travels in eastern Siberia and Manchuria, where struggles for survival in regions vast and thinly populated seemed to be primarily battles with the harsh climate and predators. Kropotkin saw that in such places cooperation among members of a species community was an important element of animal life. He asserts, "Even in the Amur and Usuri regions, where animal life swarms in abundance, facts of real competition and struggle between higher animals of the same species came very seldom under my notice, though I eagerly searched for them."[30] As a result of his own observations and his exposure to the Darwinian interpretations of other Russian theorists, Kropotkin arrived at his conviction that "sociability is as much

a law of nature as mutual struggle," and those animals that practice mutual aid have a greater chance of survival than those that do not. As he explains it, "We may safely say that mutual aid is as much a law of animal life as mutual struggle, but that, as a factor of evolution, it most probably has a far greater importance in as much as it favors the development of such habits and characters as insure the maintenance and further development of the species."[31]

Kropotkin's publications on mutual aid in the late 1880s were merely more fully supported and refined articulations of ideas that had circulated among Russians leading up to and in the wake of the release of Darwin's *Origin* and *Descent*—ideas that resulted from Russians' revisions of evolutionary theory to accommodate the specific ideological needs and national conditions of a sparsely populated country in the beginning stages of a revolutionary social and political transformation. Many leftists in Russia embraced Darwin's theories readily after their publication because they aligned with a reform vision of an enlightened future in which positivist thought and egalitarianism—and more specifically, the scientific conclusion that man is an animal and not a special creation—would replace the reigning cultural beliefs of the czarist regime, which held that "an immaterial 'spiritual aspect' separated man from the animal world and tied him to God, the Church, and the tsarist order."[32] As one leftist writer asserted in 1865, "We will not be disappointed that we, the builders of railroads, steamships, telegraphs and other marvels of civilization, are in the same category as the flying lemur, because this does not at all obligate us to fly like a bat or make faces and live like monkeys; our human characteristics will remain with us and will only serve as evidence of the great results which can occur from the gradual accumulation of the features advantageous for the development of a form, and of the improvement to the race which can result from such an accumulation."[33]

But while many Russians endorsed Darwin's theory of the evolution of species, his reliance on Malthusian struggle as the foundation of that theory was widely repudiated among Russians. Malthus's economic theories about human population growth and the resulting brutal struggle for survival in environments limited in terms of both space and resources seemed entirely inapplicable to the Russian situation of vast lands and sparse populations challenged by an inhospitable environment rather than by competition with other beings. Also, the individualistic logic of Malthus's portrait of human beings in constant competition offended the sensibilities of the Russians who, regardless of their political leanings, were committed culturally to the communal values of a paternalist and collectivist society. Russian criticisms of Malthus were most common in the politically volatile period beginning with the reign of Alexander II in 1855, during which some notable social reforms, including the 1861 emancipation of the serfs, brought to the fore questions about the form that a government should take and its role in distributing resources to a national population. The Russian edition of *The Origin of Species*

(1864) was thus circulated in a Russian intellectual scene in which Malthusian theory had been regularly criticized. Prior to the four months in which he wrote *What Is to Be Done?* from his prison cell in Siberia (December 1862–April 1863), Nikolai Chernyshevsky was one of the more notable voices on the left in Russia who criticized Malthus; he questioned the correctness of Mathus's calculations and interpreted misreadings on Malthus's part as a result of a conservative agenda—an effort to read the inequalities instituted by human social systems as an inevitable product of nature.[34]

The Russians' anti-Malthusian stance in this period was an important element of the ideological climate that would support the emergence of mutual aid as the distinctively Russian brand of post-Darwinian evolutionary thought. When Chernyshevsky wrote to his son in the 1870s about his thoughts on Darwin, he demonstrated his investment in a vision of communal cooperation that defined the Russian leftists' socialist program. "Poor Darwin reads Malthus," he wrote, "or some Malthusian pamphlet, and animated by the brilliant idea of the 'beneficial results' of hunger and illness, discovers his America: 'organisms are improved by the struggle for life.'"[35] Chernyshevsky thus dismissed Darwin's account of evolution for the "vileness of Malthusianism" it contained. With his faith in scientific positivism as the most reliable source of social ethics, Chernyshevsky found Darwin's theories of struggle and selection antithetical to the socialist ideal of human cooperation he delineated with such widespread influence in *What Is to Be Done?* While Russian intellectuals criticized Darwin for corrupting his science with Britain's individualistic ideology, Chernyshevsky's materialist social theory and his corresponding understanding of evolutionary science were products of his socialism. As one historian put it, for Chernyshevsky, "good and evil in human affairs . . . were not matters of will subject to the traditional ethical evaluations, but, rather, relativistic guides to the nature of the interaction of the individual with his environment. . . . To be good was in large part to be a member of the good, that is socialist, society."[36]

So, when Mary Bradley Lane encountered the feminist and socialist utopian vision presented in *What Is to Be Done?* through the fourth dream of Vera Pavlovna, she found much that was in concert with the ideas of the feminist reform Darwinists in America, and her narrative presents a negotiation of these dual Darwinian influences. In Vera's fourth dream, Chernyshevsky reviews the stages of humanity as a history of women's gradual movement from sexual exploitation and absolute powerlessness to a state of full equality with men, and finally to the promise of a future golden age of women's full power, when, under the tutelage of the goddess of "Love for Humanity"—who is really the noble spirit of all women embodied—humankind will realize a society of uncompromised "free will" for all. This will be a society that is "radiant and beautiful" and dedicated to the virtues and ideas the goddess represents (*WITBD*, 378–79). This utopia, this fulfillment of the promise

of his new people, Chernyshevsky makes clear, can only be realized by cooperative socialism, scientifically managed: "One has only to be rational, to know how to organize, and to learn how to use resources most advantageously," says the goddess of the fourth dream (376).

Such a portrayal of women's nurturing as the spiritual center of a more just and virtuous society fell in line with the ideas of American feminists who argued, for example, as Antoinette Brown Blackwell did:

> [Woman's] instincts impel her to self-forgetfulness in thinking and acting for her children, and inherited habit has developed and extended the tendency to whatever person or subject demands her care and occupies her thoughts. Thus her nature may have been tending for many ages towards the objective in thought, the impersonal in feeling; towards the abstract in principle. Of course, human development is complex, subject to many cross complications. . . . But, class for class, as the race now is, it is apparently easier for women to practice self-negation than for men, and more normal for them to develop an objective or perceptive intellect than a subjective or ratiocinative intellect.[37]

In making such generalizations about women's maternal tendencies, Blackwell built upon the observations made by Darwin and others about the characteristics of sex difference among humans. As Darwin writes in his chapter in *Descent* on human secondary sexual characteristics, woman's "greater tenderness and less selfishness" when compared with the "mental disposition" of man is "owing to her maternal instincts," as she "displays these qualities towards her infants in an eminent degree; therefore it is likely that she should often extend them toward her fellow-creatures" (*Descent*, 326). Such assumptions about women's special instinct for abstract love, endorsed by mainstream evolutionary thought, gave U.S. feminists support for the notion that women were more capable than men of developing a society based on cooperation and altruism rather than competition and personal gain. Hence *Mizora* imagines its entirely peaceful society founded on the bonds of maternal love; Mizoran women have used their innate talents to carefully cultivate in every generation "courtesy, gentle manners, and affectionate demeanor," which influences every community member's relations with her peers, making of that cultivation a "natural impulse of the heart, an inherited trait of moral culture" (*Mizora*, 31–32).

While a text like *Mizora* gives us insight into the affinities of reform movements of the late nineteenth century as they emerged in separate national settings, it also highlights the national differences that placed distinctive demands on evolutionary thought as would-be reformers adopted it as a tool for crafting their ideas about the possibilities for human society. Chernyshevsky presents a vision of a new people evolved peacefully from a backward and unscientific society into a perfected social bliss through gradual processes, instructed by the noble spirit of

all women. "All of this happened not in one year, not even in ten; I accomplished it gradually," says the ruling goddess of the future society she exhibits to Vera Pavlovna on a tour of civilizations through history. The goddess continues, "During your time people were still savages, such coarse, cruel, and reckless creatures. But I kept teaching them. Once they began to understand, it was not hard to make progress" (*WITBD*, 375).[38] But this fictional ideal of peaceful evolution toward the pinnacle of a beneficent, cooperative, and industrious society—an ideal that helped to support Russians' investment in the theory of mutual aid—is a Russian invention facilitated by a culturally and racially unified conception of the Russian people. Notably, the real diversity of the Siberian population—which, as I will discuss below, plays a significant role in *Mizora* in the form of Eskimos, whose appearances bookend the novel—is never acknowledged in Chernyshevsky's story. The new people of *What Is to Be Done?* seem to be the offspring of intellectuals from the most developed areas of Russia who have transformed themselves into a more virtuous, healthy, and satisfied people through a pastoral agrarian lifestyle of shared labor made enjoyable by science and technology. Chernyshevsky simply ignores the "other" populations residing in Russia's lands because their literal territorial marginalization in the real-world Russia allows him to imagine the nation without them.

Lane, however, wrote from a racially diverse post–Civil War American scene in which the problem of race difference simply could not be overlooked. Indeed, a good portion of Darwin's *Descent*, which is a key text for understanding reform Darwinism like Lane's, focuses on disproving the polygenetic racial theories of Americans such as George Gliddon, Josiah Nott, and Louis Agassiz. Polygenism accounted for the appearance of racial difference among humans as a result of separate origins, contending that the different human races constituted different species. The political and social basis for the popular attraction to such a theory in the United States is obvious. Leading up to and following the Civil War's disruption of American slavery's institutionalized racial hierarchy, and following as well the mass genocide and internment of the groups that populated American lands prior to the incursions of European explorers, polygenetic racial theory justified American whites' conviction that they need not grant the nonwhite populations in the United States basic human rights. Darwin unequivocally denounced polygenetic theory in *Descent* as simply incompatible with the evolutionary model of which he was fully convinced, and he characterized the debate about the source of racial difference as an issue of semantics rather than an issue of biological origins. The term "species" was used too loosely among scientists to be definitive; scientists even debated whether the differences among closely allied nonhuman animals should categorize them as geographical races or separate species. But the obvious and extensive similarities between humans of different races, Darwin argued, made the theory of separate origins scientifically untenable. He insisted, "Those

naturalists . . . who admit the principle of evolution, and this is now admitted by the greater number of rising men, will feel no doubt that all the races of man are descended from a single primitive stock; whether or not they think fit to designate them as distinct species, for the sake of expressing their amount of difference" (*Descent*, 907).

Hence, unlike Chernyshevsky, when Lane imagined her utopia, and imagined it through the lens of evolutionary theory, she could not simply ignore racial variation. It was a ubiquitous point of contention in the United States that in the minds of many Americans prohibited the sort of seamless graduation to a fully evolved society based on mutual aid that Chernyshevsky depicted in his novel. As we have seen, even the most advanced evolutionary theorists, like Darwin, who recognized the biological kinship of groups that were designated as separate races because of cultural and biological differences, left unquestioned the ranking of those racially marked groups in teleological progress from savage to civilized: humanity's past and its future. Consequently, in *Mizora* Lane solved the undeniable problem of racial difference and the difficulties it presents for a society based not on competition, but on mutual aid, by first acknowledging racial difference in the narrative, and then eliminating it. When Vera shelters with Eskimos after her shipwreck on the way to her imprisonment in Siberia, she focuses her description of the people on the primitive conditions and hardships of the "poor children of the North" and ultimately strikes out alone on another hazardous sea journey in her desperate search for other white faces (*Mizora*, 11–12). Then, when Vera's boat takes her through treacherous waters to the alternative world of Mizora, Lane proceeds to introduce her readers to the uniformly pale, blonde, and blue-eyed women who inherited their nation from more diverse people, who seem to be modeled on Americans. Lane spends a whole chapter relating a long history of Mizora before women took over, and that history includes first a revolution that wrested power from a privileged few and placed it in the hands of the common people, and then a civil war over slavery that produced a period of political instability and governmental abuses that ultimately ended in a popular coup staged by the women of the nation. In the new government of women, men were prohibited from governmental participation as punishment for their previous involvement in the "intrigues and plots," violence, corruption, and lawlessness that "had demoralized society" in the post–civil war era; and once women discovered the secret of asexual reproduction they eliminated the threat men still represented by ceasing to produce their kind (*Mizora*, 98–101).

Race comes into this very American history of Mizora only through the discussion of sex difference: men and women are discussed as separate races by Mizora's historians (as Darwin points out in *Descent*, the term "race" was used loosely in both common and scientific parlance to characterize a great variety of differences, to the point where the word had quite unstable significance). But race as a category

of evolutionary teleology from savage to civilized, and black to white, is implicit in *Mizora* in the fixed segregation of the sexes and the eugenic elimination of a degenerate male "race," figured as "dark" in the gallery of portraits of Mizora's ancient and now unnecessary ancestors; it is implicit also in Mizora's history of slavery and civil war that so obviously calls to mind the difficult race relations in the United States (*Mizora*, 91–93).

Even more notable for our understanding of *Mizora*'s dealings with race is the reappearance of the Eskimos upon Vera's return to Mizora with her Mizoran friend Wauna. After a failed attempt to instruct the people of Europe and America through the enlightened Mizoran ambassador's example and guidance, Vera and Wauna find that the Eskimo group they encounter when they reach the north's extremes is unwilling to assist them in their efforts to return to Wauna's homeland. Vera concludes from this, "Like all low natures, the Esquimaux are intensely selfish. Nothing could induce them to assist us but the most apparent benefit to themselves, and this I could not assure them" (*Mizora*, 146). Lane's depiction of a "selfish" race of humans who act only in their own interest and refuse to help others of another race directly challenges the mutual aid faith among Russian evolutionists that "kin selection" theory did not explain the instincts of cooperation or altruism—instincts that formed the foundation of the Russian school's understanding of a successful society. Darwin had discussed in *The Origin of Species* his understanding of what appeared to be altruism—an individual's actions that, as contemporary biologists understand it, "benefit others but entail a cost to the individual performing them"—as behavior that results from an organism's instinctive, evolutionary drive to produce individuals of its species most like itself (or, according to our contemporary understanding of genetics, an organism passes on a good amount of its own genetic code when assisting with the reproduction and survival of kin).[39] He looked, for example, at various insect species that produced neuter and sterile forms as indications that selection could work on "families and not individuals"; such sterile castes survived selection because through cooperation individuals from these castes could facilitate the survival of close kin members that retained their reproductive capability.[40]

On the other hand, Russia's mutual aid advocates—Kropotkin and his predecessors—focused on and celebrated examples of cooperation or altruism that seemed to provide no clear benefit to the individuals involved. For example, in *Mutual Aid*, Kropotkin examined burying beetle societies, members of which, as a necessary reproductive ritual, enlist the assistance of other beetles to bury the corpse of a small animal in which one of the beetles will lay its eggs, "without quarrelling as to which of them will enjoy the privilege."[41] The assistants gain no reproductive advantage for their own biological coding by assisting beetles that are not necessarily close kin. As discussed above, Kropotkin was especially intent upon rejecting Huxley's formulation of the relations of nature as a ruthless struggle

among all beings, with the exception of close kin. Refuting Huxley's Hobbesian understanding of nature as a pitched battle within which human society had developed from small family groups, Kropotkin argues in *Mutual Aid* that altruism among humans began not with the family, but with the social group. "Our knowledge of primitive man," he declares, "is rather opposed than favorable to the 'Hobbesian speculations.'"[42]

The Eskimos in *Mizora* function very differently than the tribes of the Siberian regions do in Kropotkin's *Mutual Aid*. In his account of his travels Kropotkin reveled in the rare opportunity "to see the immense advantages [these groups] got from their semi-communistic brotherly organization . . . to live with the natives, to see at work the complex forms of social organization which they had elaborated far away from the influence of civilization."[43] The Russian evolutionists emphasized cooperation within groups not necessarily kin in their evolutionary models, and they criticized the ruthlessness of the evolutionary theories grounded in the individualism of nations like Great Britain and the United States. On the other hand, Lane's exposure to the charged discourse of racial difference in the United States brings her utopian narrative of a homogeneous society built on symbiotic, cooperative principles back to an unidealized Siberia in which struggle is not merely with the elements, but also with intransigent, dark people. The novel figures these Eskimos as "lower" or "earlier" human forms that conjure for readers the Mizoran hall of portraits memorializing the eugenically excised ancestral race of dark men.

For many American reform evolutionists, the issue of kinship—or a perceived lack of it in a melting-pot nation—constituted a significant difficulty in the realization of an ideal society. On the other hand, as noted above, Russian reformers like Chernyshevsky and Kropotkin could embrace in their evolutionary reform science a distinctively sanguine understanding of the human potential for cooperation because the society they sought to transform presented few of those same challenges for them (in spite of the actual diversity of Russia's broader territories). Thus we see Lane's final turn to eugenics not just in the utopian confines of Mizoran society, but also in the solution she proposes for enabling the United States to fulfill its potential as the existing nation in the world with the most promise for realizing the Mizoran ideal. After the death of Wauna, a martyr to the ignorance and selfishness of lesser peoples of the upper world, both civilized (Russians, French, and Americans) and savage (Eskimos), Vera returns to the United States, which, after her European travels, had "impressed Wauna with a feeling more nearly akin to companionship" than had the European nations. "The time is near," Wauna had said, "when the New World will be the teacher of the Old in the great lesson of Humanity. . . . They are already on the right path, but they are still many centuries behind my own country in civilization, and in their government and modes of dispensing justice. Yet their free schools, as yet imperfect, are, nevertheless, fruitful seeds of progress" (*Mizora*, 145). In her reflections on the advances of

Mizora and the potential of the United States, Vera insists that "many, very many, evils could be obliterated were we to follow their laws," continuing, "Crime is hereditary as disease. No Savant now denies the transmissible taint of insanity and consumption. . . . The good, the just, the noble, close heart and eyes to the sweet allurements of domestic life, lest posterity suffer physically or mentally by them. But the criminal has no restraints but what the law enforces. Ignorance, poverty and disease, huddled in dens of wretchedness, where they multiply with reckless improvidence, sometimes fostered by mistaken charity" (147).

While race is not explicitly part of Lane's portrayal of the genetic predicament of the United States in her conclusion, race is undeniably present in her terminology of biologically determined criminality and degeneracy, especially when following so closely the final scenes of Wauna's significant death among the "selfish" Eskimos, whom Wauna, upon first seeing them, "presumed were animals" (*Mizora*, 143). As already noted, the Mizorans had eliminated animals—a "degrading" presence—from their world. Lane leaves us with the haunting problem of American fears of racial difference and race mixing articulated by a narrator who, with her dark hair, dark eyes, and earthy passions, feels a kinship with the eugenically unfit that Mizora's blonde legions had eliminated. In Lane's vision, the promise of an egalitarian and cooperative America is troubled by the nation's long history of racial inequality and racial anxiety. And while, in this pre-Holocaust period, eugenics was openly entertained as a path to the progress that reform evolutionists desired, Lane evidences an awareness of the moral conflict posed by a society perfected through eugenic solutions.

This single fictional text provides us with complex insight into the travels of Darwin's theories—here, in the form of U.S. feminist reform evolution and Russian mutual aid—and the way both American and Russian nationals altered Darwin's theories to address specific political and social agendas and conditions. The cooperative ideals of mutual aid were well in line with the adoption of Darwinian thought by feminists in the United States; through Darwin's theories, the American feminists who likely influenced Lane imagined women as evolutionarily specialized for nurture rather than competition, but they also fully embraced the liberating potential of Darwin's sexual selection (more than did Darwin) as a promise that through environmental changes, such as equal education and professional development, women could fully participate in the project of social progress. A fictional utopian society of educated women, which had eliminated ruthless competition, could showcase feminine nurturing as the path to the highest attainments of civilization. Mutual aid collaboration dominated Russian thought because Russians saw themselves as one people. But in America's racial and ethnic mix, especially when the nation was still dealing with the results of the Civil War, this sense of national family was difficult to capture. Lane thus created it in her utopia through a rather ambivalent embrace of a eugenic solution, adapting for

her American purposes the cooperative investments of Russian socialists' conceptions of evolutionary progress. Ultimately, an examination of *Mizora* tells us much about the complex ideological underpinnings of the translation of Darwinian theory to accommodate conditions specific to the U.S. scene—and in this translation we see the stunning adaptive malleability of evolutionary thought.

NOTES

1. The editor of the *Commercial*, Murat Halstead, writes in his introduction to the first edition of the novel in book form that Lane had "kept herself in concealment so closely that even her husband did not know that she was the writer who was making this stir in our limited literary world." See Halstead, "Preface to *Mizora*," in Mary E. Bradley Lane, *Mizora* (New York: Dillingham, 1889), 5.

2. For more on the relationship between Darwin's theories of sexual selection in late nineteenth- and early twentieth-century utopian novels—specifically the work of Edward Bellamy and Charlotte Perkins Gilman—see the essay by Kimberly Hamlin in this volume.

3. Jean Pfaelzer, introduction to Mary E. Bradley Lane, *Mizora: A Prophecy* (Syracuse, N.Y.: Syracuse University Press, 2000), xiv.

4. For other useful treatments of *Mizora*'s engagement with evolutionary thought and American eugenics, see Pfaelzer, introduction, xiii–xl; and Katherine Broad, "Race, Reproduction, and the Failures of Feminism in Mary Bradley Lane's *Mizora*," *Tulsa Studies in Women's Literature* 28, no. 2 (Fall 2009): 247–66. I offer here a fuller picture of the evolutionary science that shaped Lane's utopian vision and engage more with the scientific texts that most likely influenced Lane's racist feminism.

5. See Pfaelzer, introduction, xiii.

6. Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (1871; rpt., Princeton, N.J.: Princeton University Press, 1981), 259. Hereafter cited in text as *Descent*.

7. For more on Darwin's unwillingness to imagine human females having the same agency of selection that females in the rest of the animal kingdom possess, see Rosemary Jann, "Darwin and the Anthropologists: Sexual Selection and Its Discontents," *Victorian Studies* 37 (1994): 287–306. See also Laura M. Bolt, "Victorian Birdsongs: Sexual Selection, Gender, and Darwin's Theory of Music," in *Darwin in Atlantic Cultures: Evolutionary Visions of Race, Gender, and Sexuality*, ed. Jeannette Eileen Jones and Patrick B. Sharp (New York: Routledge, 2010), 90–108.

8. Herbert Spencer, *The Study of Sociology* (London: King, 1873), 345.

9. See Penelope Deutscher, "The Descent of Man and the Evolution of Woman," *Hypatia* 19, no. 2 (Spring 2004): 35–55; and Erika Lorraine Milam, *Looking for a Few Good Males: Female Choice in Evolutionary Biology* (Baltimore, Md.: Johns Hopkins University Press, 2010), 17, 24.

10. Antoinette Brown Blackwell, *The Sexes throughout Nature* (New York: Putnam, 1875), 136–37.

11. Judith Allen, *The Feminism of Charlotte Perkins Gilman: Sexualities, Histories, Progressivism* (Chicago: University of Chicago Press, 2009), 82.

12. Mary Bradley Lane, *Mizora: A Prophecy* (Syracuse, N.Y.: Syracuse University Press, 2000), 11. Hereafter cited in text as *Mizora*.

13. Lane writes fifteen years on page 21 and twenty years on page 144 of *Mizora*.

14. Herbert Spencer, *The Principles of Biology* (London: Williams and Norgate, 1864), 1:445.

15. Mark Pittenger, *American Socialists and Evolutionary Thought, 1870–1920* (Madison: University of Wisconsin Press, 1993), 20–21.

16. Tina Gianquitto, "Botanical Smuts and Hermaphrodites: Lydia Becker, Darwin's Botany, and Education Reform," *Isis* 104, no. 2 (June 2013): 250–77, 276.

17. Henry Maudsley, "Sex in Mind and Education," *Fortnightly Review* 15 (1874): 468.

18. Edward H. Clarke, *Sex in Education; or, A Fair Chance for Girls* (Boston: Osgood, 1873), 115.

19. Pittenger, *American Socialists*, 20, 25. Pittenger makes the important point that in general, historical accounts of Spencer that emphasize the "survival of the fittest" mentality of his later work overlook the organicist emphasis of his earlier publications, which made his theories especially attractive to reformers looking for evolution with a sense of order (20).

20. Ibid., 27.

21. Joanne E. Passet, *Sex Radicals and the Quest for Women's Equality* (Urbana: University of Illinois Press, 2003), 65.

22. Edward Beasley, *The Victorian Reinvention of Race: New Racisms and the Problem of Grouping in the Human Sciences* (New York: Routledge, 2010), 102.

23. Jean Pfaelzer, *The Utopian Novel in America, 1886–1896: The Politics of Form* (Pittsburgh, Pa.: University of Pittsburgh Press, 1984), 18.

24. Ora Brashere, *Science and Suffrage: An Inquiry into the Causes of Sex Differences* (Salt Lake City, Utah: n.p., 1909), 8, 10.

25. Qtd. in Louise Michele Newman, *White Women's Rights: The Racial Origins of Feminism in the United States* (New York: Oxford University Press, 1999), 66.

26. Michael R. Katz and William G. Wagner, "Introduction: Chernyshevsky, *What Is to Be Done?* and the Russian Intelligentsia," in Nikolai Chernyshevsky, *What Is to Be Done?*, trans. Michael R. Katz (Ithaca, N.Y.: Cornell University Press, 1989), 32.

27. Chernyshevsky, *What Is to Be Done?*, 369. Hereafter cited in text as *WITBD*.

28. Annegret Wiemer, "Corpus Ex Machina: Nikolai Chernyshevsky's *What Is to Be Done?* (1863) and Mary Bradley Lane's *Mizora* (1880/81)," *Neophilogus* 79 (1995): 188–89.

29. Qtd. in Brian Morris, *Kropotkin* (Amherst, Mass.: Humanity, 2004), 135.

30. Petr Alekseevich Kropotkin, *Mutual Aid: A Factor of Evolution* (London: Heinemann, 1902), 27.

31. Ibid., 24.

32. Daniel P. Todes, *Darwin without Malthus* (New York: Oxford University Press, 1989), 29.

33. *Russkoe slovo* 3 (1865): 254, qtd. ibid.

34. Todes, *Darwin without Malthus*, 27–28.

35. *Chernyshevskii v Sibiri: Perepiska s rodnymi* (St. Petersburg: n.p., 1913), 1:69 and 3:18, qtd. in Todes, *Darwin without Malthus*, 37.

36. N. G. O Pereira, *The Thought and Teachings of N. G. ernyševskij* (The Hague: Mouton, 1975), 77.

37. Blackwell, *Sexes throughout Nature*, 133–34.

38. It is important to note here, however, that Chernyshevsky's depiction of gradual reform is inconsistent with his well-known revolutionary stance. He apparently wrote the book to present his idealized portrait of the new people with the aim of inspiring the Russian people to initiate a takeover of the Russian governmental institutions that stood in the way of the realization of his dream for the nation.

39. Lee Allen Dugatkin, *The Altruism Equation* (Princeton, N.J.: Princeton University Press, 2006), 7, 28.

40. Charles Darwin, *On the Origin of Species* (London: John Murray, 1859), 237.

41. Kropotkin, *Mutual Aid*, 10–11.

42. Ibid., 83.

43. Petr Alekseevich Kropotkin, *Memoirs of a Revolutionist* (1899; rpt., New York: Grove, 1968), 28, qtd. in Dugatkin, *Altruism Equation*, 29.

MELANIE DAWSON

The Loud Echo of a "Far-Distant Past"

Darwin, Norris, and the Clarity of Anger

In his 1872 study *The Expression of the Emotions in Man and Animals*, Charles Darwin devotes a lengthy chapter to the blush, a bodily response he describes as "the most peculiar and the most human of all expressions."[1] This observation, as Lucy Hartley notes, was oriented to the ways in which "expressions" are tied to "specific emotional states."[2] Unlike other forms of emotion in which Darwin locates evidence of evolutionary processes, or the common expressions he depicts as linking humans and animals, the blush reveals uniquely human concerns with social interaction, specifically a state Darwin defines as "self-attention." Defining the blush as "the reddening of the face" because of the effects of "mental agitation," Darwin views the blush as the body's response to "a sense of shame," which "gorge[s]" the face with blood (*Expression*, 286). An involuntary effect, the blush can neither be invoked nor suppressed, for "the wish to restrain it, by leading to self-attention, actually increases the tendency" (ibid.). As Darwin traces a relationship between the blush and "self-attention," his discussion genders the act of blushing as feminine, for many of his examples focus on young women's admissions of their blushing tendencies, alongside accounts of women's blushes by doctors and painters.[3]

Social, feminized, and uniquely human, the blush is also strangely indeterminate as an object of analysis, for while Darwin can delineate the kind of social dynamic that facilitates the act of blushing, the underlying and more precise emotional motivations may not be clear. As Darwin suggests, individuals blush for a variety of reasons. Some may blush from the emotion of shame (*Expression*, 291), or if not wholly shame, then "in part fear" (ibid.), moral motivations (299), modesty, shyness (ibid.), "disapprobation or ridicule" (303), guilt (305), or being misunderstood (306). Thus, to witness a blush means that although there are a set of *likely* motivations, the exact origins and meanings of bodily signs remain private. Such open-

ended inquiry, with its awareness of a gap between expression and meaning, between sign and signification, is unique in *The Expression of the Emotions in Man and Animals*, where other emotions are associated with greater certainty of meaning.[4]

As Janet Browne reveals, Darwin's interest in emotion began with the birth of his and Emma's first child, William, in 1839. Experiences with his offspring convinced Darwin that "children were significant because their faces displayed the smallest emotional change in dramatic emphasis, and different moods were expressed in an apparently pure, uncomplicated way."[5] Upon observing his infant son, Darwin "first noted what he thought was *anger*" when the child was "nearly 4 months old."[6] While Darwin would attribute expressions of "anger" to his other sons, a similar attribution was "never" made in the case of his daughters.[7] These observations developed into a theory that divided the feminine and social blush from the masculine and socially isolating expression of anger, an emotion that would occupy much of Darwin's attention in *Expression*.

In late nineteenth-century fiction, too, blushing individuals (usually women) prompt inquiries into their exact emotional motivations (embarrassment, interest, confusion, excitement, among other possible motivations); by contrast, individuals motivated by anger appear as far less ambiguous. Angry acts are recognizable in regard to a set of specific gestures and movements and in relation to clear motivations and immediate responses. Anger (along with the related variables hatred and rage) appears as an outwardly directed emotion, figured as physical, aggressive, and startlingly clear. Not only are the sign and its meaning more closely related than in the case of the blush, which could signal many possible motivations, but the somatic indications of anger Darwin records—fist clenching, shaking, gnashing teeth, scowling, and allowing the wind to whistle through one's teeth—are treated as undeniable proof of a motivating emotional state, both in Darwin's account of emotional expressions and in fictions such as Frank Norris's naturalist novel *McTeague* (1899), the plot of which was inspired by a famous murder case in San Francisco. Focusing on the clear and unambiguous signs of the behaviors that led to violence, the novel explores the emotions that preceeded the murder.

Darwin's study of emotion helped to establish links between anger and less evolved, or animalistic, bodily expressions, with *The Expression* offering Darwin's "most explicit account of human origins," according to Janet Brown.[8] Indicated by a set of physical signs, which link humans (primarily men) with the manifestations of similar emotions in animals, anger allowed Darwin to believe that "humans are not exceptional."[9] Just as anger provided Darwin with what he saw as clear evidence of evolutionary processes, Norris's depictions of anger suggest the equally clear indicators of humans' animal origins. Contrasted with the blush, which Darwin cast as entirely human, anger was linked to animalism and its violent consequences. Thus its frequent appearance in Norris's novel charts the decline of the titular character, or his increasingly visible links to the animal world.

Focusing on Darwin's work on emotion, this essay traces the consequences of evolution-based thought on interrogations of American masculinity like those visible in *McTeague*, where, as in Darwin's work on emotions, affective signs become the basis for considering the relative animality of human feeling. As it asks readers to extrapolate emotion from its expression (especially in the case of anger), *McTeague* both demonstrates the raw power of anger and situates anger as central to the deterministic narrative of its protagonist's decline. Visible and unambiguous emotion thus becomes an index to the degree of an individual's personal and familial evolution or, perhaps, propensity for devolution. Intersecting with discourses about the supposedly imperiled state of American masculinity, specifically American men's perceived inability to experience passionate states of feeling, McTeague's anger suggests what a complete recovery of strong, ancestral feeling would look like and how it would affect a modern civilization characterized by urban living, professionalized masculinity, and companionate marriage. Despite others' overt admiration for his physical strength and his singularity of purpose, McTeague exhibits an unevolved emotional register that cannot survive in the modern United States, despite animated calls for American men to embrace their passions and cast off overt signs of civilization. Partially a lament for an imperiled masculine atavism and a cautionary tale about its reinstatement, the novel equates McTeague's strength with the clarity of his emotional state, which is frequently anger.

Darwin's work suggests that the more obvious the physical expression of anger, the more primitive is the impulse behind it.[10] A figure in the throes of anger, Darwin claims, "would reveal an 'accelerated' heart rate, a reddened face, dilated nostrils that quiver," and "teeth clenched or ground together" as "the muscular system is commonly stimulated to violent, almost frantic action" (*Expression*, 78). In addition, this legibly angry body is "commonly held erect ready for instant action, but sometimes it is bent forward towards the offending person, with the limbs more or less rigid. The mouth is generally closed with firmness, showing fixed determination, and the teeth are clenched or ground together. Such gestures as the raising of the arms, with the fists clenched, as if to strike the offender are common" (219). Moreover, "the gestures of a man in this state usually . . . represent more or less plainly the act of striking or fighting with an enemy" (78). Of all the emotional states he records, Darwin situates violent passions (measured by their degree of emotional intensity, with anger counting as a "passionate" emotion) in the deepest reaches of the evolutionary past. Darwin considers anger to be one of the "first exciting emotions," of the type that "naturally lead . . . to energetic movements, which react on the heart and . . . again on the brain" (81). In Darwin's estimation, "most of our emotions are so closely connected with their [physical] expression, that they hardly exist if the body remains passive" (217). The body, then, becomes the register as well as the *origin* of affective experience, leaving the

mind less profoundly engaged, or perhaps overpowered; so powerfully visceral is anger that it cannot be concealed.

Focusing on a series of flushes and cranial distensions, Darwin links emotional clarity with the facial expressions that convey anger, contending that "few men in a great passion" can conceal its play (*Expression*, 219). When experiencing revulsion, "few can resist acting as if they intended to strike or push the man violently away. The desire, indeed, to strike often becomes so intolerably strong, that inanimate objects are struck or dashed to the ground" (ibid.). Signs of anger also include "screaming, kicking, scratching, or biting everything within reach" (ibid.). Taking up the biting reflex with pointed interest, Darwin equates it with the inhabitants of the precivilized world and with the insane, in whom "passions are unbridled" (221). Biting is also linked to fury and insanity in descriptions of mental patients, who reveal their "huge canine teeth" and hiss and bite with "extreme ferocity" (222). Such patients, who are "easily aroused into fierceness," bite indiscriminately during their "paroxysms of rage" (223). With their "strange animal-like traits" and tendency to pummel others (ibid.), such subjects exhibit "the reappearance of primitive instincts," or a connection to what Darwin terms the "'faint echo from a far-distant past'" (ibid.).[11]

This echo would seem to be especially audible to a literary figure such as McTeague, who like Darwin's primitives, "'testif[ies] to a kinship which man has almost outgrown'" (*Expression*, 223). The eponymous character of Norris's novel, who reveals what Darwin terms "our affinity to the anthropomorphous apes," particularly in his readiness to use his "great canine teeth," serves as a link between man and other species, for he is the figure who has not "outgrown" clear physical signs of his emotional state (230). A man of "enormous strength," McTeague cracks English walnuts "in the hollow of his arm," lifts pianos, and, when feeling his "strength more and more," begins in the company of other men "to abuse it; he domineered over the others."[12] While some comment admiringly, "Ain't Doctor McTeague just that strong!" (181), and note, "Might as well try to stop a locomotive. . . . The man's made of iron," McTeague becomes less admirable and more menacing when angered (115). Behaving like "a raging elephant," he seeks immediate and physical revenge for an insult (114). Wounded by Marcus during a wrestling match when his "pal" bites him in the ear, McTeague first responds with "the hideous yelling of a hurt beast, the squealing of a wounded elephant," an expression that precedes a "rage" that is "a kind of obsession, an evil mania, the drunkenness of passion, the exalted and perverted fury of the Berserker, blind and deaf, a thing insensate" (181). But when "goaded . . . to evil" by alcohol, he perceives any challenge—especially from his employed wife, Trina—as "the red flag in the eyes of the bull" (234–35). When angry at his estranged wife late in the text, Mac "would lie awake nights, his clumsy wits galloping and frisking under the lash of the alcohol, and fancy himself thrashing his wife, till a sudden frenzy

of rage would overcome him, and he would shake all over, rolling upon the bed and biting the mattress" (279). At the point in the novel when "his rage loomed big within him" (281) and an "apelike agility" appears, his primitivism is clear. Restored to his premodern state, McTeague experiences increasing anger, and with it a growing propensity toward animality, which culminates in his murder of Trina when he beats her to death for hoarding money (285).

By contrast, the more civilized figure in the novel, Marcus (initially McTeague's good friend), expresses anger on a different level than does his "pal." Although he "gets so mad" (180), Marcus's anger is less aggressive: he "caper[s] with rage," or dances under its influence, engaging in a physical expression of anger but of a non-aggressive type (179). What especially angers Marcus is feeling "the impotent wrath of his own powerlessness" when his strength is compared with that of McTeague, as it is on the occasion of their wrestling match (181). At another moment of extreme anger, Marcus throws his knife at McTeague (harmlessly, it turns out), and during the wrestling match, he bites McTeague's earlobe; for his greatest act of revenge, Marcus resorts to the bureaucratic structure of the dental licensing board (reporting McTeague's lack of educational training) and to the sheriff's office, where he is deputized and acquires the handcuffs he places on McTeague in the novel's final pages. Most effective when it makes use of civilized structures, Marcus's anger cannot match McTeague's "abominable" physical exhibitions (285). And while effective, his measures earn Marcus none of the admiration that encircles McTeague's sheer force.

When he exhibits the physical manifestations of anger, McTeague enacts what are perhaps the clearest forms of expressed emotion in realist-era fiction, even as the novel attests to the consequences of unleashing premodern emotional registers in a world of dental "parlors," professional identities, and modern ideals of masculine friendship. Throughout the novel, McTeague telegraphs a level of anger that brings great clarity to the plot, since anger provides an ideological accompaniment to the novel's naturalist stance, which privileges both devolution and primitive behaviors.[13] Across Norris's novel, and most particularly at its end, anger exists in tension with the modern social world, which is dominated by licensing boards and professional codes. Cutting through the apparent felicities of modern experience, anger interjects a nonsocial, noncooperative set of behaviors into the plot.

As part of its portrait of what primitive emotion could produce if enacted in the modern world, the novel begins in the city of San Francisco, where McTeague is known in his professional guise as a dentist. The "doctor" becomes involved with the cousin of his best friend, Marcus. After a debate about who will court the young woman, Trina Sieppe, Marcus gives up Trina to McTeague. Soon after the couple becomes engaged, Trina wins a lottery for five thousand dollars, and a period of success and domestic comfort follows, which is interrupted by the state's discovery that McTeague lacks a proper medical license, for Marcus—who has

become extremely envious of McTeague—has alerted the authorities. McTeague's lost professionalism means, for the now-miserly Trina, selling their possessions and living in poverty, for she will not use her invested fortune. The couple's marital state devolves as Mac struggles to find work, Trina becomes more obsessed with saving gold coins, and Mac begins to drink, which fuels his growing brutality. The consequences of these obsessions include McTeague's murder of Trina (over the gold, which she takes out of its invested state) and his flight to the mines where he worked before becoming a dentist. The novel ends with signs that McTeague's death will take place in the "primeval desolation" of Death Valley, handcuffed as he is to Marcus, his former pal, who is now dead (313).

In the novel's early chapters, the primary emotional state is an evolved, social one. Trina blushes on multiple occasions, suggesting her embeddedness in the social world and its expectations, as in the case of her "scarlet" response to the hint of children after marriage (125). She also embodies the gendered condition of "self-attention" that Darwin associated with blushing women, thereby helping to set up the coming and oppositional emotional expressions that will characterize her husband. Before McTeague's descent into anger, however, other characters, including Old Grannis and Miss Baker, McTeague's neighbors, are in continual states of behavioral and emotional confusion, flushing and stammering repeatedly. As the novel progresses and as characters begin to overlook social concerns (with family, neighbors, professionalism, and projections of self), *McTeague* plunges into an exploration of anger's capacity to reshape contemporary social life. While anger appears as a corrective to modern social pressures, which can produce indecision and inaction (as with Grannis and Baker), anger's clarity of motivation also entails the physical, aggressively nonsocial behavior of premodern man.

In the late nineteenth-century context in which the novel appeared, in the midst of concerns about neurasthenic and overcivilized men, the novel's allusions to primitivism could be read as hopeful, for discourses about late nineteenth-century masculinity aligned anger with the type of unsullied experience that was uncommon among modern, socially constructed men. Read this way, the reinstatement of a premodern experiential realm appears to be a *restoration* of clear motivations and legible bodily signs—if all moral and social judgments are suspended, along with concerns about gendered violence and murder. Anger, when expressed, interjected into the confused world of socially constructed interaction a set of clarifying acts, recalling the type of unambiguous behavior modern man forfeited in his pursuit of civilized behavior.

Because of his awkwardness, inarticulateness, and need for creature comforts, McTeague is a man of action even at the novel's opening, where his behaviors raise questions about the benefits of human progress, in part because of McTeague's tepid and unintellectual life. Originally a miner, McTeague has become a dentist through association with a traveling "charlatan" who visited various mining towns

in the California hills (6). Never educated formally, he has nonetheless moved to the bustling, modern city of San Francisco, where his dental practice is frequented by the laboring classes. He experiences great satisfaction playing "mournful" tunes on a concertina, drinking warm steam beer in his dental chair, and idly watching the movements of traffic from his window. With his simple joys and cheap cigars, McTeague has but a precarious hold on middle-class life. Later in the novel, when he is poised to marry a neat and efficient bride, he seems assured of moving upward, both socially and behaviorally, especially when Trina introduces him to steaming chocolate, expensive tobacco, and stewed fish dinners. His story, we gather, could likely end in middle-class comfort and the promise of continued stability.

One of the early problems announced by Norris's novel, however, is that middle-class life, the desideratum of a man like McTeague, appears both shallow and unsatisfying, particularly when relative affluence entails ridiculous and random occurrences (such as winning the lottery) and tepid non-events (such as walking, shopping, sipping tea, imagining the lives of others, and storytelling). Like the modern professional men who were associated with the illnesses of neurasthenia, absent vitality, and a lack of "force" (described by scholars such as Gail Bederman, John Dudley, Anthony Rotundo, and William Gleason), McTeague, acting as a dentist, is also lackluster, passive, and reactive, despite his strength and stature.[14] At a time when modern men were believed to require the restorative effects of physical culture, organized sports, and the "West cure" as responses to the curious modern problem of overcivilization and its associated nerve and sexual weaknesses, Norris's titular character experiences a similarly modern malaise, appearing overcome with drink, food, and boredom at the novel's beginning, as he reclines in the dental chair, passively watching "the panorama unroll itself." A man who "day by day" watches "the world go past," McTeague will become more of a participant in his life once he rejects civilized behaviors for more definitive forms of action (11).

That white-collar, white, and educated professionals were encouraged to embrace their corporeal masculinity suggests the degree to which McTeague's eventual departure from his professional life could have appeared promisingly restorative and not merely a devolution. Late in the novel, when McTeague resumes the physically demanding work of the mines, his return to a simpler life echoes the stories associated with neurasthenics who engaged in manual labor so as to recover their imperiled manhood. For such men (depicted in Theodore Dreiser's *An Amateur Laborer* [1983], for example), a bracing experience of "physical culture" helped to restore their masculine status.

By the time, late in the novel, that McTeague becomes most physically expressive of his emotions, they revolve almost entirely around anger. These unambiguous actions echo not only the primitive expressions of anger Darwin described, but also contemporary calls for American men to recover their masculinity through a rejection of the ease associated with professional life. As Anthony Rotundo has

argued of passion, strong emotion emerged as one of a number of "new virtues" during the later half of the nineteenth century, when "the male body moved to the center of men's gender concerns; manly passions were revalued in a favorable light; men began to look at the 'primitive' sources of manhood with new regard; the martial virtues attracted admiration; and competitive impulses were transformed into male virtues."[15] Alongside the "competitive" male body was a belief in "action—even unthinking action—as manly," and with it a rejection of what Rotundo describes as "complex emotions," the absence of which "freed men to act boldly and decisively."[16]

In addition to his anger, McTeague also acquires an "animal cunning . . . clamor[ing] for recognition and obedience" (297), recovering the promise of a premodern masculine identity. During a period of economic privation, Mac experiences a renaissance of sorts (one that critics of overcivilization might have been quick to embrace), a restoration of masculine self-sufficiency through manual labor, catching fish and consuming them alone, "eating . . . without salt or knife or fork . . . picking the bones clean, eating even the head" (254). Notably, he refuses to share his food or bring any of his catch to the breakfast table (ibid.). A figure who has become expressive rather than reactive, selfish to the core, and a true survivalist, even before leaving the city and returning to mining life, "the dentist" becomes a man who "enjoyed himself hugely during these days," the narrative reveals (ibid.). Moreover, as "the instincts of the old-time miner were returning," the narrative reveals that "McTeague was lapsing back to his early estate" (ibid.). This "early estate" not only references his boyhood in Placer County, where his formative mining experiences occurred, but in his approximation of a primitive lifestyle, McTeague seems to have recovered his biological beginnings, as if proving the presence of evolutionary forces within him. Such associations assert a link between physical clarity and nonsocial desires to hoard one's money, to gorge oneself, and, later, to spend freely and to kill one's enemies. These actions, when linked with outbursts of anger—as anger begins to structure events in the plot—overlap with McTeague's recovery of a premodern selfhood and, with it, a set of premodern affective registers.

At such moments, McTeague's obsessive orality harks back to Darwin's theory of the biting and tooth-baring behaviors of nonhuman animals and of humans who regress to their most primitive, evolutionary impulses. Throughout the novel, teeth serve as McTeague's route to a recovered primitivism; the eruption of McTeague's animalistic nature, alongside his combat with it, begins with the primal forces linked to orality, beginning with his exploration of Trina's mouth and subsequent desire to kiss her. When he faces an anesthetized Trina in his dental chair, McTeague, "dizzied and bewildered" with the "shock" of his desire, engages in a "bitter" struggle as "his teeth ground themselves together with a little rasping sound; the blood sang in his ears; his face flushed scarlet; his hands twisted them-

selves together like the knotting of cables"—the narrative of *his* teeth's expressive actions overpowering the story of dental work on his patient (27). As the novel makes shockingly clear, McTeague's orality—his later biting of Trina's fingers, his constant need to eat (which may be interpreted as a desire to chew and grind, more than as evidence of hunger), along with his failed experiment in filling his mouth (like that of "a carnivora") with the debatably civilized object of a billiards ball—all forecast his eruption into atavistic anger. Indeed, like Darwin's primitives, the grinding of McTeague's teeth will characterize his passions from this point onward.[17]

On another level, too, McTeague's orality may reveal the residual effects of the Great Hunger, if the novel is read through the broad strokes of nationalist thinking; transmitted through the dentist's Irish heritage, hunger's residual effects may fuel McTeague's obsession with food. With his need to eat "with machine-like regularity" and for the "sake of eating, without choice," it appears that "everything within reach of his hands found its way into his enormous mouth," even on his wedding day (133). The primitive's concerns also emerge in the dentist's obsession with a gigantic, gilded tooth, "a molar with enormous prongs, something gorgeous and attractive" (7). The object of aesthetic and professional desires, given that "those big gold teeth are beautiful, beautiful," as McTeague claims (67), the tooth signals the temptation for McTeague to turn from professional living to unfettered, primitive orality. Thus when, in celebration of their marriage, Trina procures the fantastic sign, a tooth "bright as a mirror, shining there in its coat of French gilt as if with a light of its own!" (116), it heralds the couple's sense of their upwardly mobile lives, based in part on McTeague's hope for continued professional success. But while heralding their civilized success in a realm where the gold sign reminds us of gold's function as a token of civilized exchange, the tooth also stands as a looming reminder of McTeague's prehumanoid heritage, his indebtedness to a "far-distant past" that invigorates his life and clarifies his goals. As Darwin noted of mental patients and those in whom "passions are unbridled," the baring of teeth, along with tendencies to bite and gnash, serve as the visible signs of passion's origins—in nonhuman species. Thus, rather than serving solely as the marker of successful professionalism, McTeague's gold tooth predicts his regression to his most basic state, the one more akin to the animal world than to the human. Emphasizing this descent, the tooth reappears, repurposed late in the novel, when Mac and Trina are living in squalor after McTeague loses his dental practice, when the gilded tooth (having briefly served as a table, or proof of a functional orality) is sold. At this moment, the function of teeth in relation to sustenance (both earned and consumed) loses its symbolic dimension. Now McTeague's teeth demonstrate only functional, prehuman explosions of passion as actual (not representative) teeth become reminders of the primitive's basic weapons. McTeague gnashes his teeth in anger, and he "crunches" and "grinds" Trina's fingers "with his immense teeth," using them

as weapons to subdue her, "always ingenious enough to remember which were the sorest" (236). The stronger McTeague's emotions, the more decisive and brutal his actions become. Though not to be emulated, he is nonetheless a pure artifact of the past, unsullied by civilization's pressures on behavior and lifestyle.

McTeague's biting of Trina's fingers, an unambiguous oral gesture, bespeaks the presence of his unbridled and atavistic anger. That his jaws click and his teeth "[grind] furiously upon one another . . . his breath fairly whistling between his teeth" (278) at moments of rage points to what Phillip Fisher describes as the "eruptive moments" of passionate expression, or signs of clear and "vehement" passions.[18] McTeague's violently aggressive orality, moreover, begins to spread to the other characters, notably Marcus, who in a wrestling match with McTeague, experiences "the impotent wrath of his own powerlessness" and bites "through the lobe of the dentist's ear," producing a "sudden flash of bright-red blood," an act so primal that it beckons the "monstrous" brute in McTeague to break Marcus's arm (181). Late in the novel, even Trina, once so delicate and catlike, will stuff her mouth with coins in order to "jingle" them against her teeth (236). Later still, she will grind "her small teeth together and beat her head upon the floor with all her strength" when her gold is stolen (264). Influenced by McTeague's regressive qualities, both Trina and Marcus begin to exhibit the characteristics of anger, gnashing their teeth and threatening others aggressively, as if also revisiting their recessive natures—and as if anger were contagious.

THEORIES OF THERAPEUTIC EMOTIONAL REGRESSION

Writing in 1906, the psychologist William James weighed in on the state of contemporary manhood, joining the criticisms directed at overcivilized American men. In particular, he critiqued the modern man's "habit of inferiority," or failure to measure up to models of manhood from the past, based on modern man's tendency to "live far within" the "limits" of emotion acceptable for the typical middle-class man at the nineteenth century's end.[19] This was a man who was subject to such rigorous behavioral control that living "within his limits" created a set of difficulties like those attributed to overcivilization. Advocating stringent behavioral discipline so that men could "keep the deeper levels of emotion constantly in reach," James suggested a therapeutic return to the deeper passions,[20] as in his argument for the necessity of emotional training, which would produce a "strength of character, personal power, unshakability of soul," based on the marshaling of "our unused reservoirs of power."[21]

In part, James's insistence that emotional training allowed men to reach their full potential rested on his belief that emotional control was linked to self-determination. Both the Civil War and scientific discoveries challenged ideals of self-direction in the mid-1860s, when James attended Harvard. At such a moment,

"the Civil War was a great shock to men's confidence that they could predict history's course," Kim Townsend writes.[22] Moreover, by this point, scientific study pointed to a number of controlling influences on human behavior, for "Darwin had already called . . . beliefs about men's mental and moral makeup into question. Of more immediate, or at least ongoing relevance to what went on in the classroom was the rise of experimental psychology in Germany, and its importation into American thinking by American theorists like James and Hall. It made it increasingly difficult to retain the belief that all men possessed specific powers of judgment and feeling that could be strengthened in specific uniform ways."[23] And yet, control became a cornerstone of James's thinking, especially when he wrote about men's attempts to combat "inferiority."

What Townsend describes as Darwin's challenge to "men's mental and moral makeup" appears to other cultural critics as a means of understanding a nineteenth-century perception that "a natural world characterized by random and spontaneous change" confronted scholars.[24] Thus the problem was not only what unexpected challenges lay in the environment, but also how the "individual and the environment acted upon each other" and what role could be assigned to individual choice in this admixture.[25] While James seems to have settled on a complex portrait of a reactive individual who makes choices based on existing (and changeable) environmental factors, his arrival at such a situationally based portrait of personal decision making was not necessarily an easy one. Amid controversy about Darwin's findings, presented most notably by Professor Louis Agassiz (with whom James studied at Harvard), James nonetheless "reached a fairly full acceptance of Darwin's transmutation theory and rejected the most insidious argument of social Darwinism by the time he was twenty-three."[26] For James, Darwin's work meant that while an individual's "biological nature" served as the basis of perceived needs and desires, it was but one aspect of a complex personal dynamic.[27] In the case of turn-of-the-century men whose nervousness and civilized lifestyle could threaten the scenario James mentions—the individual's ability to live a life of "powerful emotion"—James sought to encourage men to counter the environmental factors that would render them emotionally "inferior."

As part of an interest in enabling modern men to recognize their passions and to manage them carefully, James advocated what he described as a "discipline to keep the deeper levels [of emotion] constantly in reach" or a means of both managing and protecting "emotions and excitements."[28] Because a modern individual's tendency to live "within his [emotional] limits" would produce "inferiority,"[29] James advised the individual to strike a balance between feeling too little and allowing oneself to experience a great rush of emotion, contending, "Every one knows on any given day that there are energies slumbering in him which the incitements of that day do not call forth, but which he might display if these were greater."[30] At a time when fathers were said to fear the "sissification" of their male offspring

as well as the influence of women caretakers, James was concerned that affective reserves in modern men would wane without proper engagement.[31] Thus he, like others who feared overcivilization's effects, looked to the past for the capacity he terms "energy," but he also viewed the past as allowing for improper restraint; thus a continual negotiation between affective power and its appropriate channeling frames his vision.[32]

Like James, G. Stanley Hall, whose *Adolescence* was published in 1904, advocated a controlled excursion through the atavistic stages of mankind, which, he believed, would help restore both vigor and virility to a feminized population of middle-class American men (not women), whom he cast as plagued by neurasthenia (or nerve weakness) and potential impotence. These modern illnesses, according to Hall, would result in the eventual sterility of the civilized (i.e., white and professionalized) corner of the human race, if adolescents were not encouraged to embrace their inner primitive, and do so at an optimal period in their development. Interventions into prehuman conditions (arranged around what he termed "recapitulation" theory) appeared to be necessary.[33] According to Gail Bederman, Hall believed that men could be "both highly civilized and deeply passionate," if boys could recapture "their ancestors' primitive emotionality." Hence, tapping into "their ancestors' vibrant passions . . . little boys could incorporate a primitive's emotional strength into their adult personalities."[34] Theoretically, then, the gap between passionate emotion in childhood and adult emotional control could be bridged by growth and socialization. Such a belief held that eventually men could have it all: passionate emotional valences and adult socialization.

At least in the circumstances imagined by critics of overcivilization, regression more closely resembled reinstatement for American men, with man's regressive behaviors pointing to a capacity to reclaim lost vitality. According to John Dudley, American literary naturalism, which depicts both violence and aggression, treated violence in ways similar to the popular spectator sports of the century's turn (boxing in particular). He suggests that descriptions of watching protagonists' bodies signaled an appreciation for the violently physical man as naturalistic fiction responded to questions about imperiled American manhood. Naturalist writing thus depicted both a "detached observation of an audience far removed from the gritty details of the human struggle" and a way to recognize that "Anglo-Saxon males imagined themselves besieged by social forces beyond their control and sought a reconciliation of the primitive and the civilized in literature, as in sport."[35] While the rules of sport meant that primitivism could be both evoked and controlled, at least according to the theory of a "rule-bound brutality," Norris's McTeague is ruled by no profession, no job, no circle of friends, and he displays a singularity of purpose that indicates there will be no boundaries to govern his passionate release through anger.[36] Bound by no imagined "ring" of rules-bound violence, McTeague becomes a test case of what a full reinstatement of atavistic passions

would mean. As Dudley suggests, the naturalist novel implicitly promised a display of the "primitive's emotional strength" in modern men. Yet in characters such as McTeague, the physical signs of emotion suggest not controlled scenarios of regression, nor interventions into overcivilized adolescence, but the potential for physical aggression to overpower civilization.

The scenes of violence stemming from McTeague's increasing atavism offer little by way of an ideal balance between behavioral clarity and emotional expression. While, for Darwin, clarity equaled emotional expression, modern social life demanded more tempered expressions, if not more moderated feelings. McTeague's premodern tendencies demonstrate Herbert Spencer's observation that the passions could be "destructive" and displayed via "a general tension of the muscular system, in gnashing of the teeth and protrusion of the claws, in dilated eyes and nostrils, in growls; and these are the weaker forms of the actions that accompany the killing of prey."[37] As a character who engages in gnashing and destruction, McTeague reveals an anger that becomes the mechanism of release from a life that is tepid, stale, and somewhat laughable, but simultaneously the potential for danger increases.[38] As the novel reveals, in some manifestations anger conjoins with its affective companion, hatred.[39]

There are no social layers that effectively mitigate McTeague's emotional outbursts, at least not after his profession disappears from his life. As Lee Clark Mitchell argues, such characters emerge from naturalists' tendency to "defamiliarize our sense of the 'self,'" or a modern, socially controlled corporeal sense of the self.[40] As a figure devoid of the modern individual's exercise of conscience, or any internalization of regulating forces, McTeague engages his emotions fully once he has little to lose by doing so. Thus the self he expresses is not a modern, socially constructed identity, but a selfhood rooted in strong, pure emotional motivation. As his atavistic blood begins to beckon more forcefully, its emergence overrides the modern individual's capacity to negotiate his world's expectations, or to engage with what Darwin termed "self-attention," a socially constructed sense of the self's place in a larger society.

Frank Norris's statement that "we Americans have never been a primitive people. Very possibly it is to our disadvantage," suggests something of his interest in portraying the nonsocial, premodern character who cannot resist his own impulses.[41] As Norris emphasizes emotional purity, as revealed through McTeague's body, he invokes an understanding of affect that intersects with the contemporary belief that emotions were constituted *by* physical expression and not simply channeled *through bodies*, as in James's contention that "emotion dissociated from all bodily feeling is inconceivable."[42] Querying the centrality of physicality to emotional expression, James focuses not only on bodily effects, but also on the ways in which individuals in the thrall of those effects seemed able to exert little reason. Equating emotion with its physical effects, he raises the question: "Can one fancy the state

of rage and picture no ebullition of it in the chest, no flushing of the face, no dilation of the nostrils, no clenching of the teeth, no impulse to vigorous action, but in their stead, limp muscles, calm breathing, and placid face? The present writer, for one, cannot."[43] In "What Is an Emotion?" James describes deep and profound motivations when he points to the impossibility of experiencing an emotion like "rage" without reference to its physical manifestation, describing emotion as a "senseless bodily effect."[44] "In such cases," James writes, "we see plainly how the emotion both begins and ends with what we call its effects or manifestations. It has no mental status except as either the presented feeling, or the idea, of the manifestations."[45] Such assertions make clear the problem of understanding passion—of any variety—in the modern world: the individual laden with a modern subjectivity and capable of social negotiation is clearly valued (though he may be dull). But so is strong, uncompromised emotion, which is tied to a physiological (not cognitive) experience. How to conjoin them, however, remained the conceptual problem.

In other late nineteenth-century practices, a compromise of sorts was achieved between the modern social man and the man who looked back in time for his models, by playing at primitivism in specific and controlled ways. In his discussion of fraternal rituals in nineteenth-century culture, Mark Carnes describes the ways in which fraternal organizations forged emotional identification among club members through initiation rites, where the rituals sought to "remake" men.[46] As Carnes notes, "Even as the emerging middle classes were embracing capitalism and bourgeois sensibilities, they were simultaneously creating rituals whose message was largely antithetical to those relationships and values."[47] At the same historical juncture, white-collar professionalism replaced physical exertion for many men, and the complex ethics unique to the financial markets supplanted the clarity of entrepreneurial capitalism.[48] Companionate marriages challenged men's practice of congregating in clubs or bars with their male companions. In this context, invocations of "primitive" cultures offered a fantasy of restoration, of an unnegotiated experience, of physical proof, and of a life that was not bound by abstract expectations. By presenting an "emotionally charged psychodrama centering on family relations," fraternal organizations such as "the Improved Order of Red Men" hosted initiation rituals that engaged a "primitive past," where representatives of Native American tribes welcomed middle-class white men into a transhistorical, transcultural brotherhood.[49] With its invocation of the "tribes" of the order, its ritualistic patterns of honoring "warriors" and "hunters," "scalping knives and war clubs," and the "children of the forest," the ritual encouraged various physical feats.[50] These staged events were meant to prove the initiate's courage in a physical scenario of contest that alluded to a mythical Native American past. In darkness, and often in a simulated wilderness, these invocations of primitivism were then left behind at the close of the ritual. Implicit in Carnes's account of this fraternal order

is its portrayal of what would have been considered primitive in relation to bourgeois manhood, which had by the turn of the twentieth century become defined by a set of abstractions that were difficult to celebrate as appropriately masculine.

In Norris's novel, McTeague's very existence serves as a comment on the deleterious abstractions of bourgeois life, for the ephemeral experience of bourgeois man is challenged by McTeague's powerful and frightening capacity for both physicality and regression as ordinary dentistry begins to resemble ferocious mining (since miner and dentist are one). In addition, a once-social man becomes dominated by his instincts and desires (first for Trina, then for sustenance, and finally for gold). Not only does McTeague extract teeth with his bare fingers, but as he breaks out of his professional role, he engages in greater physical feats: he wrestles, breaks limbs, gorges himself, sleeps soundly, and demands coins, food, and security. There is no idea that will satisfy him, no abstract sense of ethics or propriety that will hold him, in contrast to the era's professional man who, as Burton J. Bledstein has argued, was constrained by the abstract ideals rooted in professional ethics.[51] Always more miner than dentist, McTeague becomes a powerful and singularly motivated man whose path in life is linked to immediate impulses and tangible objects.

Readings of McTeague's primitivism are usually attached to his first erotic experience in the novel. In this frequently referenced passage, when McTeague first kisses the anesthetized Trina, "the male virile desire in him tardily awakened, aroused itself, strong and brutal. It was resistless, untrained, and a thing not to be held in leash an instant," thus inviting an inquiry into the masculine impulse's relation to a linear plot trajectory (*McTeague*, 24). But it is when his passions turn from lust to anger that McTeague is at his most dangerous. Anger is also the register of emotion that allows McTeague to live fully and to perish spectacularly; it is anger that allows for a plot characterized by precipitous descent, which harks back to a distant past, now recovered.

When it first appeared, *McTeague* received the admiring attention of reviewers; its perceived clarity was embraced as part of Norris's innovative, gender-specific vision. Initial readers frequently referenced its "sweeping strokes," "gigantic scale," and "spacious canvas," the kinds of description that underscore the prevalence of the exterior world.[52] References to the "exhilarating spectacle" of Norris's fiction and to his "superb thesis" and "sociologic epic" highlight the ideological dimensions of the deterministic universe he created.[53] The cultural work of this type of fiction, according to such reviewers, was broad, constituting an elongation of the novel's scope in the wake of the realists' insistence on a particularity of location, characterization, and moment. More strikingly, reviewers also understood Norris's fiction as reinstituting a model of masculinity that had faded from view. As Norris's fiction developed from "coincidence . . . to catastrophe," as one reviewer put it, the novel seemed to take on a distinctly gendered style, imbued with confrontation and "guts."[54] Writing for the *Bookman*, a reviewer argued that the "brutally

realistic" *McTeague* operates according to "instinct and creed," developing an idea, "expanding and elaborating, and dwelling on it, forcing it upon the reader with accumulated synonym and metaphor, driving it home with the dogged persistence of a trip-hammer."[55] This single-minded insistence, moreover, is equated with the fact that Norris "was a strong, fine, manly thinker," wrote another. The same review continued by casting the author as "a splendid type of the best young manhood of to-day," possessed of "the strength and rare power vividly to picture life as it really is. . . . Hence, his created characters became colossal and typical."[56] From W. D. Howells, who cites Norris's great "impression of strength and courage" as well as his "manly work, great work," came the observation: "he made me feel that he could do it, the thing he meant to do, and do it robustly and quietly."[57] The recurring characterization of Norris as "a man of the Western world—alert, collected, fearless, and with powers fully ripe," along with the sense of his work as developing "in a straight line, gaining impetus and power with every page," underscores the narrative force and unambiguousness that were interpreted as eminently masculine in *McTeague*.[58] If the titular character was problematic, the scope of Norris's vision was not, and such reviews suggest the degree to which Norris's work was understood as interventionist, if not restorative, on behalf of modern men.

What remains to be explored is the degree to which anger is central to this representational clarity on the levels of both characterization and plot. Anger becomes linked to gold in Norris's novel, not simply in terms of motivation, but in terms of unassailable value; like gold, anger is a pure tender, a clear sign, an emotion of ancient and enduring value, but it is also a substance unsuited to the modern world of circulation. The unrefined, angry McTeague possesses unassailable value, but he cannot exist in a modern world, where he becomes a purely destructive force.

PRIMITIVISM RESTORED

McTeague's return to his inner primitive is set up as a response to the lackluster qualities of an ordinary life, which are portrayed in the novel's early chapters. Particularly in regard to McTeague's friendship with Marcus, the overpowering anger visible in the novel's end appears as a more authentic form of experience, while the masculine camaraderie at the novel's opening is portrayed both as facile and, on occasion, as idiotic (as in the moment when McTeague and Marcus fill their mouths with the same billiard ball as proof of their mutual regard). The men's long walks, nights at bars, and reciprocal favors are particularly important because theirs is the relationship that frames the entire narrative, occupying more space and more affective energy than McTeague's lust for Trina, which quickly fades.[59] The friendship between the men is most significant because it shows the dramatic effects of McTeague's growing tendency to exhibit an anger that is both expressive and unsocial. As it gestures back to a deep and visceral past, anger appears to be

more profoundly motivating than love or friendship or lust, and of greater strength than any ideal of civilized manhood.

Early in the novel, civilized manhood appears as a construct that the men reference for behavioral models. Just before the "pals" orally exchange a single billiard ball, we are told that Mac and Marcus "took a great pleasure in each other's company, but silently and with reservation, having the masculine horror of any demonstration of friendship," a comment that can only be read as ironic, given the ridiculous display that will follow (*McTeague*, 43). Marcus, who began the evening by proposing "a walk, a long walk, by damn!" (42) that will be "outa sight" (43), organized around exercising dogs from the animal hospital where he works, launches into a discussion of romantic entanglements, speculating casually, "Guess you're in love." He continues, "Maybe I can help you. We're pals, you know. Better tell me what's up; guess we can straighten ut out. Ah, go on; spit ut out" (44). The men talk, to their increasing discomfort. It is not only that McTeague, as Marcus guesses, is in love—with Trina Sieppe, Marcus's cousin and presumed sweetheart—but also that McTeague fears that his desire for Trina will bring about a disruption of the men's camaraderie. In this social triangle, there is no clear solution. It is thus a moment that exemplifies overcivilized angst and, with it, the absence of clear and decisive action.

Although McTeague initially finds the conversation about Trina "abominable" and cannot speak (44), Marcus, the more thoroughly civilized of the two, insists on self-revelation, highlighting the confusion the novel attributes to modern civilization or, more specifically, to modern men (ibid.). At last, after much prompting, "stupidly" McTeague mutters Trina's name and speaks at surprising length, at greater length, in fact, than at any other point in the novel:

> I tell you, Mark, I can't help it. I don't know how it happened. It came on so slow that I was, that—that—that it was done before I knew it, before I could help myself. I know we're pals, us two, and I knew how—how you and Miss Sieppe were. I know now, I knew then; but that wouldn't have made any difference. Before I knew it—it—it—there I was. I can't help it. I wouldn't 'a' had ut happen for anything, if I could 'a' stopped it, but I don' know, it's something that's just stronger than you are, that's all. She came there—Miss Sieppe came to the parlors there three or four times a week, and she was the first girl I had ever known,—and you don' know! Why, I was so close to her I touched her face every minute, and her mouth, and smelt her hair and her breath—oh, you don't know anything about it. I can't give you any idea. I don' know exactly myself; I only know how I'm fixed. I—I—it's been done, it's too late, there's no going back. Why, I can't think of anything else night and day. It's everything. It's—it's—oh, it's everything! I—I—why, Mark, it's everything—I can't explain. (45–46)

Dominated by interrupted syntax, exemplary of McTeague's inability to form a coherent sentence, this speech presents the dentist as a man who cannot successfully

navigate the social world, along with his unsuitedness to an environment where emotions are socially contextualized, or where they are anything other than visceral.

Though the civilized McTeague appears as a comic character, Marcus is even more indicative of civilization's problematic demands on men, for he exhibits an essential insincerity that is continually equated with diluted, responsive, socially constructed ideas, rather than with strong or visceral emotions. According to a theory such as William James's, Marcus would benefit most from an infusion of strong emotion, which would help him to recover his "powerful" motivations, exchanging deep feeling for social performances and political prattle. Yet, acting in ways counter to what James seems to have imagined, Marcus gives up "his" claim to Trina, overcome with "the sense of his own magnanimity" (47). He is also influenced by a sense of bourgeois selfhood constituted by a web of social relations that bear little resemblance to strong emotion and that substitute personal desires for abstract values, such as "pity," "heroism," and "friendship." Marcus "saw himself as another man, very noble, self-sacrificing; he stood apart and watched this second self with boundless admiration and with infinite pity. He was so good, so magnificent, so heroic, that he almost sobbed. Marcus made a sweeping gesture of resignation, throwing out both his arms, crying: 'Mac, I'll give her up to you. I won't stand between you'" (ibid.). Motivated by the image of his "ennobled self," Marcus, tears in eyes, "no doubt . . . thought himself sincere," the narrative relates. "At that moment, he almost believed he loved Trina conscientiously, that he was sacrificing himself for the sake of his friend" (ibid.). Despite attempting to claim a model of friendship equated with nobility and honor, self-sacrifice and renunciation, all of which he unconsciously dilutes, Marcus (at his most profoundly overcivilized here) cannot experience pure or meaningful emotion; his tepid affective level remains informed by abstractions, at least at this point in the novel. Rather than emotions proper, his motives are ideals and self-projections. His thoughts, his actions are not indicative of *his* passion but rather of his attachment to civilized personhood. The performative nature of Marcus's apparently magnanimous act is confirmed several chapters later, when he discovers that Trina (now engaged to McTeague) has won five thousand dollars in a lottery. This good fortune prompts Marcus to claim that Mac "stole away my girl's affections and now that he's rich and prosperous and has got five thousand dollars that I might have had . . . he's played me for a sucker" (112). If emotional depth can be read as a major concern infiltrating the novel's early (and misleading) emphasis on friendship, then it is Marcus who is most in need of therapeutic intervention, based on modern man's failure to recognize his deepest motivations.

And yet, at this moment of ostensibly sincere discussion, the text insistently historicizes masculine behavior as Marcus "heroic[ally]" "give[s] up" his sweetheart to McTeague. An intrusive narrative voice asserts, "What a fine thing was this friendship between men! The dentist treats his friend for an ulcerated tooth and refuses

payment; the friend reciprocates by giving up his girl. This was nobility. Their mutual affection and esteem suddenly increased enormously" (47).[60] While Marcus and McTeague bask in the apparent "nobility" of their mutual regard, the narrative compares their relationship to that between "Damon and Pythias," a friendship in which one man nearly sacrificed himself for the other, who was condemned to death and late for his execution (ibid.). Broadening, the narrative continues, "It was David and Jonathan; nothing could ever estrange them. Now it was for life or death" (ibid.). Here, Norris invokes the story of rivals for the throne of Israel; rather than engage in rivalry, however, the two men shared a deep friendship, as described in the book of Samuel. Biblical scholars agree that the friendship was strong and rooted in a covenant of some sort, though the nature of the relationship has remained a source of debate (i.e., whether it was platonic, romantic, or homoerotic).[61] According to Axel Nissen, nineteenth-century discussions of male friendship involved a "familiar roll call of legendary male friends," including David and Jonathan, and Damon and Pythias, or narratives that feature various tests to which relationships are subject.[62] During an era when "friendship was central to the culture and the literary marketplace" and when "there was little debate" about friendship's merits, Norris introduces a strong and looming conflict through allusions to McTeague's purity of motivation, a purity that will divide the precivilized from the civilized man.[63] While they predict that their friendship will survive "life or death," it will be "death"—in the desert—for the "pals." That they die at one another's hands, not those of a common adversary, suggests the essential superficiality of their bonding and sets up the text's interest in deeper, less socially oriented animosity to come.

These examples of selfless affection (in the case of Damon and Pythias) and affection rooted in strong homosocial bonds (David and Jonathan) for masculine relationships suggest that the noble covenants of the past are self-consciously reenacted in the present, thereby granting borrowed value to modern masculine friendships. As Michael Kimmel notes, there were 475,000 members of the Knights of Pythias around the year 1897, clubs in which, as with so many fraternal organizations, men "could experience the pleasures and comforts of each other's company and of cultural and domestic life without feeling feminized."[64] Norris critiques the strength of such socially construed affect, situating it as less pure, less visceral than truly ancestral emotions such as anger.[65] No man of 1899 actually considered risking his life for another. Considering oneself to be either Pythias or his comrade did not mean risking bodily harm, nor experiencing any emotion as deep as anger.

The supposed strength of the McTeague-Marcus friendship, rooted in civilized constructs, will be challenged by deeper emotional valences of anger. When goaded by Marcus, McTeague becomes the target of a knife flung by his "pal," then breaks Marcus's arm. McTeague murders his wife, and Marcus hunts McTeague into Death Valley, where McTeague bludgeons Marcus, and Marcus takes his revenge by handcuffing McTeague to his own expiring body, thereby ensuring Mac's ex-

cruciating death in the desert. As the novel continues to contrast the consequences of engaging emotional depth with the superficial qualities of contemporary masculine bonding, camaraderie appears but a distant memory, overpowered by clear and individualized violent anger. Such a violent plot emerged at a cultural moment when, according to E. Anthony Rotundo, there existed a belief that there could be "a better balance between civilization and the inner savage" based largely on engaging one level of emotional intensity: passion.[66] Such strong emotional levels, Darwin's work in *Expression* suggests, help explain the prehuman origins of emotion, for across the animal world similar passions exist without signs of social conditioning. The belief in passion's value, however, lay in a belief that it could be revisited through controlled scenarios, rendering passion something to be harnessed, based on the fear that "civilization had so fully repressed [men's] passions that their very manhood—their independence, their courage, their drive for mastery—was being suffocated." Thus, displays of strong emotion took on "a new and honored place in the bourgeois definition of manhood."[67] *McTeague* shares something of this extended lament for an emotional register that was neither widely practiced nor socially sustainable in 1899, situating pure anger as worthy of lengthy exploration, even if it eventually appears as too deeply ancestral for the contemporary world.

As scholars such as Phillip Fisher have argued, the passions of antiquity, from which the literary nomenclature of emotion emerged, had waned by the mid-eighteenth century. In Fisher's view, literary texts took up the exploration of "states of feeling," which he regards as unacceptably bland. The classical passions, which engendered full plots and often violent actions, inscribed an experiential dimension that functioned as an emblem of a distant past.[68] Rooted in the concept of "strong states of emotion" based on "the model of anger," the "vehement" passions, such as "wonder, pity, mourning, fear, anger, grief and shame," were by the mid-eighteenth century replaced by notions of milder "emotions," which, according to Fisher, engendered "a different organization and set of implied edges, meanings, and core instances."[69] Emotional meanings thereafter encompassed "natural or colorless examples" of affect, along with a modern preference for "moods" or "low-energy conditions" and a "preferred [vision] of inner states," which we may interpret as explorations of interior subjectivities of the type that Norris largely avoids.[70]

Once McTeague recovers the purity of his emotions, now divested of civilization's influence, he is invigorated by what James described as a "fund and capital"[71] of emotion—a veritable bank account of ancestral passion—and his trove of treasure appears far greater than the spoils of Trina's lottery. Signs of this invigoration are indissolubly linked to McTeague's recovered primitivism. As early as McTeague's lengthy confessional speech to Marcus, primitive expressive gestures appear in the dentist's behavior. As if he is stupefied by the modern love triangle, "His arms moved in fierce, uncertain gestures, his face flushed, his enormous jaws shut together with a sharp click at every pause. It was like some colossal brute

trapped in a delicate, invisible mesh, raging, exasperated, powerless to extricate himself" (*McTeague*, 46). This repository of atavistic gestures reveals a being that begins to tap into a deep emotional state, now that he is free of civilization's behavioral figurations. If civilization is "delicate" and "invisible" in its operations, the atavistic man by contrast is visible, clear, and self-assertive.

The strength of McTeague's passion for Trina forces even Marcus to recognize that his own affection is comparatively tepid, a moment that sets up in the narrative an appreciation for McTeague's brutishly single-minded behavior. Not only is Marcus interested in any number of "girls," as he realizes, but "the singleness and strength of McTeague's passion startle[s] him," once it is revealed (*McTeague*, 46). Moreover, "he could see very clearly that McTeague loved Trina more than he did; that in some strange way this huge, brutal fellow was capable of a greater passion than himself, who was twice as clever" (47). The contrast between Mac and Marcus also suggests that not only do some men possess a greater capacity for passion, but modern man possesses a profound (and ultimately destructive) admiration for passion, the more basic the better. With his self-interested passion, his one friend, his one woman, and his desire for a single gold tooth, McTeague represents affective purity in the modern world, at times in laughably simplistic ways, but in ways more focused and definitive than those of the modern man.

Yet with the deeper passions positioned as key to the restoration of masculine vigor, a conceptual double bind emerges in the novel, as it did in turn-of-the-century culture. According to alarmists, the absence of vigorous emotion could gradually result in the obliteration of civilized manhood, and yet, as Norris demonstrates so vividly, a vigorous engagement with passion is not without extreme and negative consequences. After Marcus's discrediting of the doctor, and with it the loss of Mac's professional identity, McTeague's passion appears to be linked indissolubly to his descent into animality, in support of Darwin's linkage of primitive ancestors and primal passions. Here, as in evolutionary theory, there can be no passion without an accompanying primitivism; the complete man requires a regression down the evolutionary scale. Thus, while McTeague recovers his passions, his transformation is deeply problematic, for it brings about domestic violence, drunken rages, theft, murder, robbery, and bludgeoning in the desert.

Initially "strong, stupid, docile and obedient" (*McTeague*, 7), McTeague acquires an "ape-like agility" (285) and greater cunning as he regresses down the evolutionary scale and as he gains direction and clarity through expressions of anger. As McTeague's repeated threats remind readers, the anger latent in his character lies alarmingly near the surface, revealed in his regular assertion, "You won't make small of me" (77, 213), and later and more ominously, in his threat to Trina, "Ah, if I had hold of you once, I'd make you dance" (278). As in Darwin's theories, where strong emotion acts as a reminder of a basic evolutionary propensity, McTeague erupts with nonsocial emotion. When irritated, as when Trina wakes him in the

night with her nightmares, Mac, upon realizing that "it was only Trina," responds violently. The novel asserts that "his anger kindled abruptly," such that "sometimes he would hit her a great thwack with his open palm, or catch her hand and bite the tips of her fingers" (252). In the wake of Trina's "persistent stinginess," McTeague becomes "more than ever brutal to her. He would box her ears or hit her with a great blow of the back of a hair-brush, or even with his closed fist," and "his old-time affection for his 'little woman'" appears "unable to stand the test of privation" (236). Trina thus functions as a measuring rod for McTeague's anger, a flesh-and-blood barometer of emotion, which the neighbors note without understanding the breadth of the story. "The people about the house and the clerks at the provision stores," we learn, "often remarked that Trina's finger-tips were swollen and the nails purple as though they had been shut in a door" (ibid.). The cause, of course, is McTeague who, "when he had been drinking, used to bite [her fingers], crunching and grinding them with his immense teeth, always ingenious enough to remember which were the sorest" (ibid.). When we see that "the dentist went away from this bootless visit to his wife shaking with rage, hating her with all the strength of a crude and primitive nature. He clenched his fists till his knuckles whitened, his teeth ground furiously upon one another" and "his wrath strangled him; He clutched at the darkness in front of him, his breath fairly whistling between his teeth," there is little trouble predicting an even more profound enactment of his anger (278). And, as William James's work suggests, Mac's bodily expressions of anger increase its emotional valence in what appears to be a vicious cycle of primitive affective expression and emotional generation.

Based on the plot's eventual developments, it does not appear that McTeague and Marcus, despite their camaraderie, participate in a teleological trajectory of masculine fraternity from the ancients to the moderns, as the David and Jonathan allusion first suggests, but their relationship will demonstrate the destructive power of precivilized passion, once it is unleashed. Theirs is nonetheless a movement not of controlled or even of allegorical *regression*, but of a dramatic *recovery* of a passionate affective register, one that initially promises to be as pure and rich as gold, but that fails to live up to its promise of curing modern man. What is a modern man to do with his recovered passion? As Norris's novel suggests, the lack of fit between his primitive emotion and his modern environment predicts disaster, reminding readers that evolution (like devolution) should be matched to a specific environment, to which a species responds. While McTeague's flight from the city (after his murder of Trina) promises to match him to a primitive landscape, he is hunted by a representative of civilization, namely the newly deputized Marcus.

In debating the value of primitive emotion as well as the value of unrefined substances, the novel positions passion as a parallel to the gold McTeague discovers. Late in the plot, when he strikes a vein of gold in the mines, McTeague (now fully atavistic: alert, decisive, and deadly) debates the relative value of two forms of

the metal. One form is the gold in the mine, which in all likelihood is worth more than a million dollars, he calculates. It far outweighs the five thousand in minted coins from Trina's lottery win (stolen by Mac when he murdered Trina), which McTeague carries in his saddlebag. Obeying an instinct to hide in more remote locations, to elude Marcus and the sheriff's posse (to elude civilized justice, that is), McTeague leaves the unrefined and valuable gold and carries away the coins, for which he fights Marcus in Death Valley, where they are utterly useless. As the two grapple for the saddlebag of coins—coins taken out of circulation, unusable in the desert, much less valuable than the canteen of water sacrificed for them, and less valuable too than the blood in an overlooked mule's carcass—the men are seemingly at their closest to pure atavism. And yet their choices continue to be influenced by civilization. Though now regressed in many ways, they nonetheless show signs that they have been shaped by modern civilization. They demonstrate what it means to possess a skewed sense of values, an inability to orient themselves to the most basic of resources. Having been socialized to eschew pure materials and absolute passions alike, they squander their most valuable natural resources and, in privileging gold coins instead, reap the inevitable and fatal consequences of thirst (and anger) in the desert.

Read in such a way, both McTeague and Marcus appear primitive in their emotional responses to one another, but not quite primitive enough in their thinking. Unresponsive to the value of unprocessed materials, whether gold or water or passion, they (like modern man) have lost their bearings. This is the case not only for the modern man Marcus, but also, at crucial moments, for even McTeague, who perverts his instinctive sense of unassailable value when influenced by Marcus, who remains an emblem of the modern world and its relentless quest to tame the primitive. Without Marcus, McTeague would mine, accrue wealth, and live contentedly perhaps. So, while passionate emotion appears dangerous, even deadly, its dangers are primarily linked to civilization. Absent civilization's context, the dangers encircling atavism appear minimal, even restorative, if not exciting. But at the novel's end, it appears that any primitive man who bows to the emblems of civilization is doomed from the moment of his acquiescence. In a society inclined toward bonding oaths, small fortunes in inconvenient coinage, and obsessions with songbirds in gilt cages, once-precious materials are pressed into shape, stamped, and processed, their value as substances all but forgotten. There can be no return to the passions of the past in such a context or, in evolutionary terms, no controlled and partial regression for the specific purpose of invigorating modern man. Once the passions of the past are recovered, they have no place in a modern context.

Premodern to the core, McTeague attests to the presence of deep and enacted passions that spring from some remote source, a rich reservoir of undiluted emotion. His recovery of his elemental manhood, his exercises with teeth-baring and with biting all attest to his uncontrollable passions and, with them, a demonstration of

the behaviors that evolution had all but eliminated from modern men. Affirming the power of the past—and its consequences in the short life and violent death that accompany any attempt to revisit it—the novel suggests that there can be no control over the purest emotions. Whereas ostensible friendship can mask a propensity for regressive and violent behavior, an enactment of passionate anger reveals itself as more powerful than the organizational rubric of restored masculine vigor, and far more deadly. In McTeague's case, the ancient emotional impulses supply not only a set of affective resources—seemingly unlimited—but also a representational clarity. Divested of all oaths, all compromises, all socially constructed behaviors, the men in the text become a testament to the clear, purifying, and unambiguous effects of ancestral emotion and a last glimpse of the emotionally pure, premodern humans who would disappear (without heirs) from the collective gene pool.

NOTES

1. Charles Darwin, *The Expression of the Emotions in Man and Animals*, ed. Joe Cain and Sharon Messenger (New York: Penguin, 2009), 286. Hereafter, citations will be given in the text.

2. Lucy Hartley, *Physiognomy and the Meaning of Expression in Nineteenth-Century Culture* (New York: Cambridge University Press, 2001), 152.

3. Darwin mentions, for example, the problematic example of the account of a painter who witnesses a blush upon "the chest, shoulders, arms, and whole body of a girl, who unwillingly consented to serve as a model, who reddened when she was first divested of her clothes" (*Expression*, 290).

4. On the issue of both Lamarckian thinking and anthropocentrism, see A. S. Barnett, "The 'Expression of the Emotions,'" in *A Century of Darwin*, ed. S. A Barnett (Cambridge, Mass.: Harvard University Press, 1958), 206–30. Also see Hartley, *Physiognomy*, 147, for a discussion of Darwin's lack of any "sentimental attachment to his offspring" while recording their tears, scowls, and anger.

5. Janet Browne, "Darwin and the Expression of the Emotions," in *The Darwinian Heritage*, ed. David Kohn with Malcolm J. Kottler (Princeton, N.J.: Princeton University Press, 1985), 308. Also see William R. Charlesworth and Mary Anne Kreutzer, "Facial Expressions of Infants and Children," in *Darwin and Racial Expression: A Century of Research in Review*, ed. Paul Ekman (New York: Academic, 1973), 91–168. For similar reasons, the insane would also become important subjects in this study, for these individuals were believed to experience "the strongest passions, and give uncontrolled vent to them," according to Charlesworth and Kreutzer, who quote Darwin ("Facial Expressions," 93).

6. Charlesworth and Kreutzer, "Facial Expressions," 96.

7. Ibid.

8. Janet Browne, "Darwin and the Expression of the Emotions," 310.

9. Cain, introduction to *Expression*, xx.

10. See Lewis Petrinovich, "Darwin and the Representative Expression of Reality," in

Darwin and Racial Expression: A Century of Research in Review, ed. Paul Ekman (New York: Academic, 1973). According to Petrinovich, "Darwin had originally intended *The Expression of the Emotions in Man and Animals* (1872) to be a chapter in *The Descent*, but the length became so extensive as he compiled his notes that he published *The Expression* as a separate volume the year following the publication of *The Descent*" (228).

11. Here Darwin quotes Henry Maudsley.

12. Frank Norris, *McTeague: A Story of San Francisco*, ed. Jerome Loving (New York: Oxford University Press, 1995), 179, 177. All references to *McTeague* hereafter cited in the text.

13. Browne, "Darwin," 309.

14. See Gail Bederman, *Manliness and Civilization: A Cultural History of Gender and Race in the United States, 1880–1917* (Chicago: University of Chicago Press, 1996); John Dudley, *A Man's Game: Masculinity and the Anti-Aesthetics of American Literary Naturalism* (Tuscaloosa: University of Alabama Press, 2004); Anthony Rotundo, *American Manhood: Transformations in Masculinity from the Revolution to the Modern Era* (New York: Basic, 1994); and William Gleason, *The Leisure Ethic: Work and Play in American Literature, 1840–1940* (Stanford, Calif.: Stanford University Press, 1999).

15. Rotundo, *American Manhood*, 222.

16. Ibid., 224–25.

17. When McTeague harbors a sense of superiority over a rival dentist, whom he considers a mere "poseur" who rides a bicycle (*McTeague*, 116), all diplomas aside, the novel suggests that McTeague has a right to his notions of superiority rooted in strength and visceral tendencies, tendencies that later emerge as long-concealed passions.

18. Phillip Fisher, *The Vehement Passions* (Princeton, N.J.: Princeton University Press, 2003), 18–19. Fisher writes that "even within any ordinary list of the passions some are likely to seem essentially occasioned, eruptive, and event like, even while having also a dispositional form, while others are the opposite, primarily dispositions, and only rarely event like" (19). Moreover, because anger figures as an "eruptive momentary impassioned state," it functions much like the states of grief and fear, or passionate experiences that stem from a "single, experiential moment" (18–19).

19. William James, "The Energies of Men," in *William James: Writings 1902–1910* (New York: Library of America, 1987), 1239. The essay was originally delivered in 1906.

20. Ibid., 1231.

21. Ibid.

22. Kim Townsend, *Manhood at Harvard: William James and Others* (New York: Norton, 1996), 122.

23. Ibid.

24. Linda Simon, *Genuine Reality: A Life of William James* (New York: Harcourt Brace, 1998), 147.

25. Ibid. Simon describes part of the difficulty as a moment characterized by "the clash between science (notably, Darwin's theory of natural selection) and philosophy—in the form of German idealism and British empiricism" (xxi). She continues, "Darwin taught his contemporaries that the natural world was characterized by spontaneous change, interaction between the individual and its environment, and more significantly, by choice. For philosophers who would function only in an ordered and unified universe, these ideas

were threatening. For James, eagerly attentive to particulars, practices in scientific method, and searching for an affirmation of his own authority, these ideas seemed copiously fertile" (ibid.).

26. Robert D. Richardson, *William James: In the Maelstrom of American Modernism: A Biography* (New York: Houghton Mifflin, 2006), 64.

27. See Richard M. Gale, *The Philosophy of William James: An Introduction* (New York: Cambridge University Press, 2005). According to accounts of his life, James struggled with the implications of Darwin's theory as it pertained to random change. Taking issue with what Darwin termed "accidental variations," James sought to assert the possibility of an existing, if obscure, set of reasons governing adaptation. According to Gale, as James incorporated the consequences of Darwin's findings, James's thinking served "not as a reconciler but as a unifier between his scientific and moralistic selves," or the moralistic self of the nineteenth century, inclining toward order, and the scientific self, accepting many possibilities (2). Gale writes, "James's chief reason for preferring his particular empirical account over those rivals is based on a Darwinian view of human beings as determined by their biological nature to be always intent on satisfying some felt need or desire, even if the need or desire is not itself directly determined by biological states or processes. Because it is our nature, it seems reasonable to make the attainment of this our moral ideal. For what other end could we have? Given the scientific account, the normative conclusion appears to be the only practically viable alternative open to us human beings. Unlike natural law theorists, James would not claim that the scientific account of man's nature logically entails any normative proposition" (21).

28. James, "Energies," 1225, 1231.

29. Ibid., 1239.

30. Ibid., 1224–25.

31. Michael Kimmel, *Manhood in America: A Cultural History* (New York: Oxford University Press, 2012), 160.

32. Ibid.

33. The era's medical discourses encouraged men to conserve their physical potency. As Bederman points out, "According to medical experts, masturbation—or even too-frequent marital intercourse—threatened a man's health by wasting his limited stock of nerve force" (*Manliness*, 83). Whatever the reasons given for this crisis of masculine "force" (there were many) this power was believed to be in "finite supply" and therefore imperiled (ibid.).

34. Ibid., 95. Also see Mark Carnes, *Secret Ritual and Manhood in Victorian America* (New Haven, Conn.: Yale University Press, 1991). Initiation rituals conducted by fraternal organizations of the type described by Carnes offered possibilities for spectacles of controlled regression through interactions with models of various ancestral figures.

35. Dudley, *A Man's Game*, 19, 21.

36. Ibid., 22.

37. Qtd. in Hartley, *Physiognomy*, 142. Also see Jerome Loving, introduction to Frank Norris, *McTeague: A Story of San Francisco* (New York: Oxford University Press, 1995), ix–xxviii, which notes that "like many literary naturalists, Norris subscribed to the theories of Herbert Spencer, whose synthetic philosophy attempted to modify Charles Darwin's theory of natural selection, which saw evolution and survival as a matter of chance in terms

of who would be strong enough to survive. Spencer was a Lamarckian who argued, in terms of what was later called Social Darwinism, that the survival for existence was moral because it produced the best for the race as a whole" (xi).

38. Dudley, however, reads McTeague's violence as part of the "destructive or degenerative tendencies lurking beneath the surface of apparently civilized men" (*A Man's Game*, 33).

39. Darwin's chapter stresses the combination of hatred and anger/rage.

40. Lee Clark Mitchell, *Determined Fictions: American Literary Naturalism* (New York: Columbia University Press, 1989), xii.

41. Norris, "The National Spirit as It Relates to the 'Great American Novel,'" in *The Literary Criticism of Frank Norris*, ed. Donald Pizer (Austin: University of Texas Press, 1964), 117–18.

42. William James, "What Is an Emotion?" in *Collected Essays and Reviews of William James*, ed. Ralph Barton Perry (New York: Longmans, Green, 1920), 255.

43. Ibid., 254–55. James takes little interest in the passions as defined by Aquinas or Aristotle, which figure less prominently in his work than those that he categorizes afresh.

44. Ibid., 259–60.

45. Ibid.

46. Mark C. Carnes, "Middle-Class Men and the Solace of Fraternal Ritual," in *Meanings for Manhood: Constructions of Masculinity in Victorian America*, ed. Mark C. Carnes and Clyde Griffen (Chicago: University of Chicago Press, 1990), 44.

47. Ibid., 51.

48. See Alan Trachtenberg, *The Incorporation of America: Culture and Society in the Gilded Age* (New York: Hill and Wang, 2007).

49. Carnes, "Middle-Class Men," 45.

50. Ibid., 41–42.

51. See Burton J. Bledstein, *The Culture of Professionalism: The Middle Class and the Development of Higher Education in America* (New York: Norton, 1978). According to Bledstein, the professional person "structured a life and a career around noble aims and purposes, including the ideal of moral obligation. But most importantly, the professional person absolutely protected his precious autonomy against all assailants, not in the name of an irrational egotism but in the name of a special grasp of the universe and a special place in it" (92).

52. Frederic Taber Cooper, "Frank Norris, Realist," *Bookman* 10 (Nov. 1899): 238. Also see Hermione Lee, *Willa Cather: A Life Saved Up* (London: Virago, 1989). Of Norris, Cather wrote admiringly, "He is big and warm and sometimes brutal, and the strength of the soil comes up to him with very little loss in the transmission. His art strikes deep down into the roots of life and the foundations of Things as They Are" (Lee, *Willa Cather*, 9). "Review of 'The Pit,'" *Arena* 29 (Apr. 1903): 236.

53. "Notes of a Novel Reader," *Critic* 36 (Apr. 1900): 353; and Hamlin Garland, "The Work of Frank Norris," *Critic* 47 (Mar. 1903): 216.

54. "Summer Reading: Notes upon the New Books," *Review of Reviews* 19 (June 1899): 749; Talcott Williams, "Fiction Read and Written in 1901," *Review of Reviews* 24 (Nov. 1901): 591.

55. Cooper, "Frank Norris," 235, 236.

56. "Review of 'The Pit,'" 400–2.

57. W. D. Howells, "Frank Norris," *North American* 175 (Dec. 1902): 777. Howells compares Norris, unfavorably, to Crane's work, saying that Norris writes "without the tremor of 'those electrical nerves' which imparted itself from the presence of Stephen Crane."

58. "Review of 'The Pit,'" *Atlantic Monthly* 91 (May 1903): 691–92.

59. For a discussion of the masculinist (as well as the misogynist and racist) elements in the text, see John Dudley's *A Man's Game: Masculinity and the Anti-Aesthetics of American Literary Naturalism* (Tuscaloosa: University of Alabama Press, 2004); and Eric Carl Link, *The Vast and Terrible Drama: American Literary Naturalism in the Late Nineteenth Century* (Tuscaloosa: University of Alabama Press, 2004).

60. See Denise Cruz, "Reconsidering *McTeague*'s 'Mark' and 'Mac': Intersections of U.S. Naturalism, Imperial Masculinities, and Desire between Men," *American Literature* 78, no. 3 (2006): 487–516, on both homoerotic desire and the "slapstick comedy" of the billiard ball exchange (488).

61. After David killed Goliath, he and Jonathan met at King Saul's court and immediately began a close and lasting friendship. Jonathan, Saul's son, formed a covenant with David; the depth of their mutual affection persisted even when Saul attempted to kill David and after David fled Israel; his lament over Jonathan's death describes his affection for Jonathan as exceeding that for women. The relationship has long been regarded as a platonic ideal, though some interpreters have viewed the relationship as exceeding such a paradigm. Also see *The Interpreter's Dictionary of the Bible: An Illustrated Encyclopedia*, vol. 4 (New York: Abingdon, 1962). The Marcus-McTeague pact resonates with the taking of biblical oaths, particularly the type of oath that was "consummated by putting the hand under the thigh (Genesis 24:2, 47:29). Clearly this is an act relating the oath taker to the seat of life in the other party. Likely this was contact with the genital organs" (630). The scene with the billiard ball resonates with this ancient practice of swearing on the testicles.

62. Axel Nissen, *Manly Love: Romantic Friendship in American Fiction* (Chicago: University of Chicago Press, 2009), 14.

63. Ibid., 13.

64. Kimmel, *Manhood*, 172.

65. Nissen, *Manly Love*, 13.

66. Rotundo, *American Manhood*, 232.

67. Ibid.

68. Fisher, *Vehement Passions*, 4.

69. Ibid., 11, 5.

70. Ibid., 6–7. See Adam Potkay, *The Story of Joy, from the Bible to Late Romanticism* (New York: Cambridge University Press, 2007), for a discussion of the emotional levels frequently attributed to the modern experience. Potkay describes "ambient" conditions, "sensations," "mere feelings," "moods," and "simple feelings" as well as "non-directed emotional states," which have no real cognitive component, as contrasting with the classical passions (7).

71. James, "What Is an Emotion?" 259.

TINA GIANQUITTO

Criminal Botany

Progress, Degeneration, and Darwin's *Insectivorous Plants*

Queen of the mast imperial *Drosera* treads
Rush-fringed banks, and moss embroider'd beds;
Redundant folds of glossy silk surround
Her slender waist, and trail upon the ground;
Five sister-nymphs collect with graceful ease,
Or spread the floating purple to the breeze;
And *five* fair youths with duteous love comply
With each soft mandate of her moving eye.
As with sweet grace her snowy neck she bows,
A zone of diamonds trembles round her brows;
Bright shines the silver halo, as she turns;
And, as she steps, the living lustre burns.
—Erasmus Darwin, *The Loves of the Plants* (1789)

The absorption of animal matter from captured insects explains how *Drosera* can flourish in extremely poor peaty soil.
—Charles Darwin, *Insectivorous Plants* (1875)

I have been attracted to visit these colonies of the sun-dews in order to study their curious ways. I have seen the delicate and painted fly disjointed and crushed, its splendid and wonderful eyes torn asunder by the hungry plants; the little moths, themselves but velvet atoms rejoicing in the warm sunlight, but now slowly melting away, limb by limb, in these horrible vegetable stomachs; their life and marvelous form and startling beauty all wrecked to feed a sundew in one of these Droserian graveyards. . . . Surely here, if anywhere, is *vegetable wickedness*.
—J. G. Hunt, "Natural History Studies" (1882)

The three epigraphs—the first from British poet-botanist Erasmus Darwin, the second from his grandson Charles Darwin, and the third from the American natural history writer J. G. Hunt—trace the singular trajectory of the humble marsh plant, *Drosera rotundifolia* (the common sundew), from flower to floral carnivore, from queen to criminal. When Erasmus Darwin wrote about the *Drosera* in his best-selling erotic flower poem *The Loves of the Plants*, little was known about the true nature of the plant's "silver halo"—a viscous, dew-like secretion that gathers in drops at the end of each crimson filament-like leaf.[1] What had been observed, with some consternation, was that mired in this "silver halo" was a mass of dead and desiccated insects.

Several early observers, such as the eighteenth-century botanist William Bartram, had speculated on a carnivorous purpose in the plants' seeming traps, but it took Charles Darwin and his careful investigations to prove that not only did flies, midges, and many other insects often meet a sticky end in these secretions but, more important, the plants capture, kill, and ingest them to compensate for nutritional deficiencies in the marshy, nitrogen-poor soil they universally inhabit. In his writings on the newly dubbed "insectivorous plants," Darwin described a dark world of plant digestion, replete with smotherings, crushings, drownings, entanglings, and absorbings. Indeed, the language Darwin used to describe the process of entrapment and digestion was evocative: the "extremely common" sundew "annually slaughtered" a "prodigious" number of insects.[2] As news of the new floral carnivores spread with the publication of Darwin's monumental treatise on the subject, *Insectivorous Plants* (1875), these plants and others like them, such as the Venus's flytrap and the pitcher plant, were transformed by popular opinion into the villains of the plant kingdom. As the Italian criminal anthropologist Cesare Lombroso would have it, carnivorous plants represented the "embryology of crime," and he argued in *Criminal Man* (1884) that they "establish that premeditation, ambush, killing for greed, and, to a certain extent, decision-making" were embedded in the "microstructure of organic tissue" and thus represented the "dawn of criminality."[3] For Hunt, writing for the Quaker periodical *Friends' Intelligencer*, the *Drosera* was clearly a degenerate, inhabiting the killing fields of "vegetable wickedness."[4] But is it? Is killing for food morally wrong? Do the actions of these plants correspond, as Lombroso would have it, to "human crimes rooted in hunger and indigence?"[5] "To live is not an innocent thing," Anatole France reminds us in a critique of Lombroso's theory. Are plants criminal because they feed on animals—just as their human "kin" feed on plants—to survive?[6]

The existence of flora that trapped, killed, and ingested living organisms seemed to force such questioning from many who came into contact with the plants in life or in print. In Hunt's article for the *Friends' Intelligencer*, for instance, the "facts so repulsively depicted" by the author caused so "much uneasiness among many . . . readers" that the editors were prompted to address their concerns in a later num-

ber of the periodical: readers were assured that a "continuation of the subject by the writer would explain the seeming opposition between the facts . . . and our faith in the wisdom and goodness of the Creator."[7] The plants likewise prompted botanists, such as Bartram, to meditate on divine design—or the absence of it, in the case of Charles Darwin—and on the intent of "the Author of nature" who endowed these "sportive vegetables" with both "artifice" and reason sufficient "to intrap incautious deluded insects."[8] Indeed, the curious attributes of these floral oddities had long attracted attention as botanists sought to unravel the mystery of the "irritable power" of plants like the *Drosera*, the *Sarracenia* (pitcher plant), and the *Dionaea* (Venus's flytrap).[9] In the late eighteenth century, as one might expect in an era when one of the best-selling books was Erasmus Darwin's volume of erotic flower poetry, the unusual appearance of the *Dionaea*—with its hinged trap of a soft pinkish-red color, fringed with soft spikes—elicited a bawdy exchange between botanists John Bartram and Peter Collinson. In letters to Collinson, Bartram described the "wagish" American species of flower as "Tipitiwitchet," a ribald term that, as one scholar notes, incorporates all manner of salacious meanings, including "Toothed Vagina," a hangman's rope or noose, "Snatch-box," and prostitute's "vulva."[10] The American naturalist Mary Treat, an expert in carnivorous plants and a correspondent of Darwin on the subject, imagined herself a "prisoner" to the plant when she inserted her finger into the *Dionaea*'s trap to test its strength. After two hours, she admits that she "lost control of her nerves" and abandoned her experiment.[11] Even the normally sedate Charles Darwin claimed in letters to his friends that he became a "madman" under the spell of "that wicked dear little Drosera."[12]

What, if anything, can Darwin's study of insectivorous plants tell us about the reception of Darwinian evolution in the American scene? Plants as a whole are largely invisible in most accounts of the impact of evolutionary theory in the United States and elsewhere, even though a majority of Darwin's published works, especially those published after *On the Origin of Species* (1859), concerns the morphological adaptations of plants and flowers. As Peter Ayers notes, plants taught Darwin significant "new facts about convergent evolution and about competition" and about the "possible links between structure and function."[13] Even still, scholars have yet to consider to any great extent the impact that Darwin's plant research had on the public's conception—and its acceptance or rejection—of evolutionary theory.[14] Yet plants were hardly invisible to Darwin's contemporary readers. The historian Elizabeth Keeney argues that botany was by far the most popular science in nineteenth-century America for both "recreational and pedagogical purposes."[15] Botany was studied and enjoyed by tens of thousands of enthusiasts, and amateur botanists of the era scoured the woods and fields looking for specimens to dissect and discuss. Sentimental flower language books, which explicitly linked botani-

cal study to naturalized gender norms and which transformed plants into moral emblems of ideal behavior, were enormously popular throughout the nineteenth century. Many of these books adapted to the Darwinian frame later in the century, making Darwin's plant research available to a wide range of readers.[16] These readers, male and female alike, also followed with both knowledge and interest the often highly detailed discussions of plant morphology found in most popular magazines of the century. In short, the audience for Darwin's plant books was fully prepared to comprehend the evolutionary analogies between human physiology and plant structure, and between human nature and plant psychology that undergirded Darwin's explanations of the plant world.

Charles Darwin's influential yet little-studied plant work, specifically the experiments that led to his proof of plant carnivory, forms the basis of this essay. Jonathan Smith argues that Darwin's "experimental plant physiology" led to "a revolution in botany" in the latter nineteenth century.[17] Darwin demonstrated to an astounded public that such essential qualities of the flower as scent, coloring, and form had nothing to do with "man's gratification," as he explained in *Origin*, and everything to do with sex and reproductive success.[18] Or, as American author Caroline Creevey put it bluntly: "The end of a plant's existence is not to make pretty flowers, but to reproduce itself."[19] By methodically experimenting on an astonishing variety of plants—climbers and twiners, primulas, orchids, and insectivorous plants among many, many others—Darwin relentlessly added to the arsenal of facts, what Whitney Davis calls the "nuts and bolts" constituting the proofs of the theory of evolution by natural and sexual selection.[20]

But Darwin's insectivorous plant studies performed both a more specific and a more holistic function. As Smith observes, Darwin's deep fascination with plants that eat living organisms helped to propel the breakdown of "rigid distinctions between plants and animals" that was a hallmark of Darwin's botany.[21] Moreover, according to A. Hunter Dupree, "plants which behaved like animals and showed in their sensitivity the rudiments of a nervous system were demonstrating . . . the most fundamental of Darwinian generalizations."[22] Occupying "the borderland between animal and plant life," these "insect-eaters"[23] illuminated a Darwinian truism: the "whole organic world, plant and animal, is akin."[24] Even the seemingly static boundary between flora and fauna erodes on the evolutionary view, and fascinated readers came to comprehend a world where they were related not only to the gorilla but also to the gladiola. Darwin understood what he was seeing when he looked at *Drosera*—that the leaves of the plant executed voluntary movements in response to specific stimuli, that they exuded a digestive enzyme analogous to pepsin, that he was looking at a "disguised" and "rather a most sagacious animal."[25]

Some commentators, such as the American writer and amateur botanist Sophie Bledsoe Herrick, embraced the expanded vista offered by evolutionary theory. Herrick attributed her desire to write about humble subjects like protozoa, micro-

scopic pond life, and especially carnivorous plants to her hope of highlighting "the parallel between animal and vegetable life in their lower forms." "The series in the animal world," she continued, "not only reaches infinitely beyond and above the highest vegetable development, but, strange to say, it begins lower down."[26] At the same time, Herrick's juxtaposition of "beyond and above" with "lower down" accurately marks the paradox embodied by carnivorous plants: they simultaneously represented both "progress" and "the dark side of progress."[27] Darwin's insectivorous plants inhabited precisely this middle ground between the lowest animal and the highest vegetable forms and thus represented a special challenge to moral, evolutionarily inflected notions of difference in the American scene. For one, Darwin's insectivorous plant studies confirmed that the world of ruthless competition extended to all forms of life. The "exquisite" adaptation of carnivorous plants to their environment represented evolutionary progress as Spencer saw it: adaptation resulted not only in the fittest form but also in the ruthless best. At the same time, these organisms, which transgressed the borders between plant and animal by a kind of chemical alchemy eerily analogous to that of humans, were seen by many as representing a degenerate or "morbid derivation from an original type."[28] These plants represented a kind of "fall from grace" that was typically associated with degenerate forms, and, as can be witnessed in the literary responses to Darwin's conclusions, many worried that these no longer lovely plants, which seemed to revel in wanton destruction, threatened ideas about "the orderly progress of the society."[29] The insectivorous plant came to embody a series of contradictions that highlighted the unease invariably accompanying the boundary-blurring nature of Darwinian evolutionary theory: these plants were both "normal" and "abnormal," "healthy" and "morbid."[30] They represented both growth and decay; their very materialism threatened theological arguments from design; and they generated both fascination and terror. The debates over the status of carnivorous plants (animal or plant; rational or irrational; moral, immoral, or amoral) revealed the plant to be a "quintessential problem-object," to use Anne McClintock's term, through which the evolutionary conundrum could be "negotiated and contested."[31] In their status as neither plant nor animal but a lot of both, carnivorous plants transgressed seemingly static and well-established boundaries; as such, they reflected the concerns surrounding evolutionary theory generally.

The conceptual reconfiguration of the natural world that accompanied the Darwinian evolutionary narrative placed many in mid- to late nineteenth-century America in a profoundly disturbing position, facing a paradigm shift that necessitated an entirely new way of looking at the world and its natural systems. The vivid and graphic descriptions of plant carnivory, of plant movements, of lines of descent that stretched beyond primates into a primordial ooze, like those that so troubled the readers of the *Friends' Intelligencer*, prompted many writers to consider the philosophical and religious consequences of this shift. Edith Thomas's

1891 poem "The Sundew Speaks" cogently represents the carnivorous plant as a "problem-object" for late nineteenth-century America. In the poem, a rational sundew, speaking directly to the audience, chides a hypocritical meat-eating botanist for condemning the plant's non-vegetarian ways:

> A prying creature bore me from my place,
> Me much admired, but started back apace
> When one who trimmed a *hortus siccus* said,
> "Observe how this same tender plant is fed."
>
> For when some few trapped midges were espied,
> Straightway my ruddy filaments were dyed
> As rank on rank of sanguinary spears,—
> Hypocrisy lurked in my jeweled tears!
>
> And why, forsooth, my table do you chide?
> No vegetarian you, flesh food denied,
> Who now call down with lead the wingèd kind,
> Now bid the field, the stream, your diet find!
>
> Moreover (still the Sundew urged the case),
> It were but fair the chased at length gave chase,
> And, since so long my compeers have fed flesh,
> Some plant should tangle *yours* in cunning mesh![32]

This poem reveals the fundamental questions facing actors and agents in the evolutionary drama: Are plants active participants in the struggle for existence ("since *so long* my compeers have fed flesh")? Or are they passive objects fit only to receive the gaze of the human ("A prying creature bore me from *my* place")? Do plants express "proper" emotion ("my jeweled tears")? Or are they simply mocking human ideals ("Hypocrisy lurked")? Do plants possess consciousness ("still the Sundew urged the case")? Do they possess volition and the power of movement ("It were but fair the chased at length gave chase")? Are plants willfully, intentionally murderous ("Some plant should tangle *yours* in cunning mesh")? In granting the plant consciousness ("still the Sundew urged the case")—and, more important, in turning that conscious gaze back on the "observer" ("one who trimmed a *hortus siccus*," or herbarium specimen)—Thomas questions the charges of violence, wantonness, and criminality that marked much of the discussions about carnivorous plants. Certainly, degeneration to a lower, morally corrupted, and atavistic form was seen as a possible threat attendant upon the evolutionary narrative. But at the same time, Thomas's plant demands recognition as a highly evolved creature—one with its own desires, motives, and habits, one perfectly adapted to its environment and thus "fit." Outside of the evolutionary context, such concerns might be curiously intriguing but ultimately unimportant. Put in

the context of evolutionary origins and common lines of descent, however, these organisms assume new and transformative meanings.

"BEWARE, OH, YE VEGETABLE EATERS! . . . SUNDEW A CANNIBAL": THE TRANSFORMATIVE NATURE OF DARWIN'S BOTANY

Plants and flowers offered an endless source of inspiration for Charles Darwin, even more so, it seems at times, than animals, as comments in many letters to his friends attest. Botanical study and correspondence also comforted the naturalist in some of his darkest hours. Charles and his wife, Emma, turned to their little daughter Annie's flower garden to comfort them during the illness that killed her.[33] Likewise, he began his early studies of carnivorous plants in the long shadow of his daughter Henrietta's poor health.[34] To read Darwin's plant books, such as *On the Various Contrivances by Which British and Foreign Orchids Are Fertilized by Insects* (1862), *The Movements and Habits of Climbing Plants* (1875), *Insectivorous Plants* (1875), *The Effects of Cross and Self Fertilization in the Vegetable Kingdom* (1876), and *The Different Forms of Flowers on Plants of the Same Species* (1877), is to see a man deeply infatuated by the object of his inquiry, and his descriptions of a multitude of plants are replete with loaded, emotional terms. Plants, on Darwin's view, were not passive objects suffering quietly metaphorical transformations into queen or criminal, but rather they were active participants in the drama of evolution. He saw them as creatures with "sensibility," possessing objectives, desires, and even feelings, and envisioned them as performing goal-oriented actions "in manifest relation to their wants."[35] For instance, when the leaves of *Drosera*, which Darwin considered "first rate chemists," encountered "a bit of dry moss or peat . . . its tentacles clasp it in a useless manner" before they "discover their mistake and release such innutritious objects."[36]

Clearly, as even a cursory review of Darwin's writings can attest, few organisms, if any, were beneath his interest. But what made the "humble sundew" take such a hold of his imagination? The naturalist's correspondence with friends and fellow botanists displays his intense enthusiasm for the subject, writing often about his progress with his "beloved Drosera" and chastising himself for those times when absorption in other work caused him to send "the precious little things even for a moment to the dogs."[37] These letters also reveal something about the fundamentally unsettling nature of these plants. Early in his study of the plant, he confessed to his friend the geologist Charles Lyell his feeling about "that wicked dear little Drosera": "I will & must finish my Drosera M.S. which will take me a week, for at this present moment I care more about Drosera than the origin of all the species in the world. But I will not publish on Drosera till next year, *for I am frightened and astounded by my results*."[38] Writing to his American friend the

botanist Asa Gray, Darwin again acknowledged that he flinched at the implications of his results, explaining: "I have gone on working at Drosera, but shall not publish till next summer, as I am frightened by my results & must retest them." Darwin does not explain the source of his fear, but clues and suggestions can be garnered elsewhere in the letter. To begin with, Darwin, while commenting on Gray's influential review of *Origin*, states for perhaps the first time to his friend that he "cannot honestly go as far as you do about Design." He argues further that, unlike Gray, he cannot accept "'that variation has been led along certain beneficial lines.'"[39] Perhaps, as he wrote this, he was thinking about the "baited trap" of his *Drosera*, "excellently adapted for the special purpose of catching insects," which resulted in what is often represented in *Insectivorous Plants* as a slow and torturous death for the captured prey.[40]

When Darwin began his investigation into the *Drosera*, he understood little about the plant's physiology—and he was not alone. Joseph Hooker, an eminent botanist and an intimate friend of Darwin, notes in his account of these "*brother-organisms*" that while many scientists had accurately described the "habits" of carnivorous plants, "few inquired into their *motives*."[41] Until Darwin came along, that is. It was Darwin's intimate understanding of the complex relationship between an organism and its environment that ultimately enabled him to unravel the mystery at the heart of the sundew, and indeed all insectivorous plants. Darwin proved conclusively that these plants, which inhabit boggy, nutrient-poor areas, compensated for nutritional deficiencies by transferring responsibility for the uptake of nutrients from the roots, where it typically resides, to the leaves. In order to accomplish this task, the plant's leaves adapted to trap insects, secrete digestive fluids, and ingest the nitrogen-rich proteins of the insects' bodies. Insects are often the preferred meal, especially in the plants' natural habitats, but, as Darwin's and Mary Treat's experiments proved, they also ingested animal meat.[42] In the process of detailing plant carnivory, Darwin also neatly argued a case for "parallel evolution" by proving that carnivorous "habits" developed in distinct groups of plants "in response to a common driving force."[43] He patiently recorded the numbers of flies, gnats, spiders, and other insects captured and consumed by species of *Drosera*, *Dionaea*, *Sarracenia*, *Utricularia*, and others. They, in turn, were subjected to countless irritants (camel hair brushes, paper strips, pieces of hair, bits of cinder, clear glass, blue glass, sand—virtually anything that came to hand). Darwin meticulously cataloged each response, and the accrued details resulted in an astoundingly complete portrait of a seemingly sentient creature.

Darwin published the results of his studies, not in 1861, as he anticipated in his letter to Lyell, but, in true Darwinian form, fourteen years later in 1875 after compiling exhaustive data on the subject. *Insectivorous Plants* thus details Darwin's attempts to understand the "motives" of carnivorous plants, namely their "remarkable" ability to process nitrogen from living organisms in much the same way as

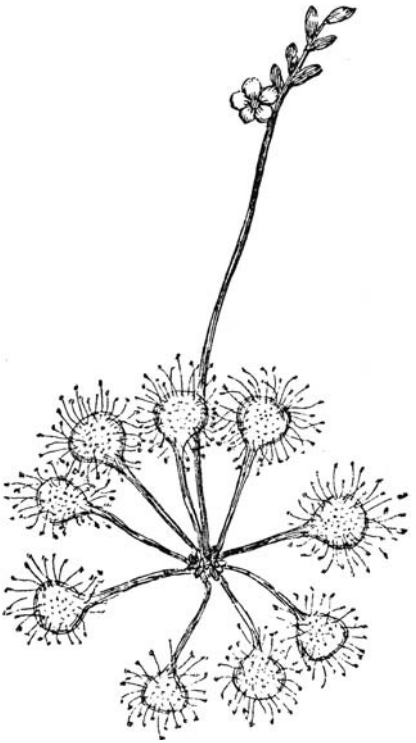

Figure 1. *Drosera rotundifolia*. From Mary Treat, *Home Studies in Nature*, 180.

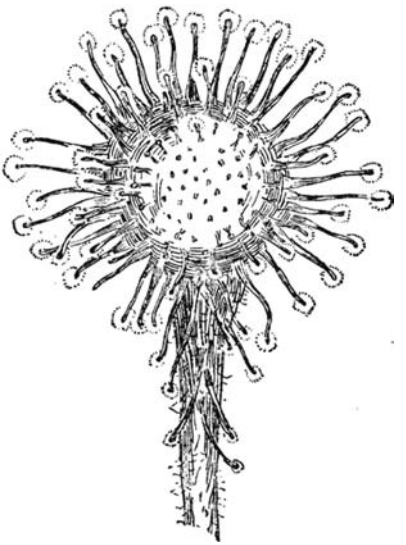

Figure 2. *Drosera rotundifolia* (after Darwin). From Mary Treat, *Home Studies in Nature*, 176.

Figure 3. Open leaf trap of *Dionaea muscipula*. From Mary Treat, *Home Studies in Nature*, 185.

humans do, by employing digestive acids analogous to the enzyme pepsin, which is found in animal stomachs. As he explains: "Finally, the experiments recorded in this chapter show us that there is a remarkable accordance in the power of digestion between the gastric juice of animals with its pepsin and hydrochloric acid and the secretion of Drosera with its ferment and acid belonging to the acetic series. We can, therefore, hardly doubt that the ferment in both cases is closely similar, if not identically the same. That a plant and an animal should pour forth the same, or nearly the same, complex secretion, adapted for the same purpose of digestion, is a new and wonderful fact in physiology."[44]

Although Darwin insists that plants do not possess anything akin to a brain, or "a central organ, able to receive impressions from all points, to transmit their effects in any definite direction, to store them up and reproduce them," he nevertheless marvels that the leaves of the *Drosera* are able "to transmit a motor impulse to a distant point, inducing movement." "With Drosera," he explains, "the really marvellous fact is, that a plant without any specialised nervous system should be affected by such minute particles; *but we have no grounds for assuming that other tissues could not be rendered as exquisitely susceptible to impressions from without if this were beneficial to the organism, as is the nervous system of the higher animals*."[45] Darwin had earlier speculated, in a letter to Hooker, that "if plants have diffused nervous matter" one would expect "some degree of analogous action." He continued: "And this is partially the case. Considering these experiments [on the passing of a signal from the tentacle to the basal part of the plant], I cannot avoid the conclusion, that Drosera possesses matter at least in some degree analogous in constitution & function to nervous matter."[46] Such conclusions were not lost on Darwin's readers either: the acclaimed orchid expert John Lindley, on reading Darwin's plant studies, exclaimed that his theories "shake to the foundation all our ideas of the stability of genera and species."[47] Stable boundaries between human and nonhuman collapse as the reader is reminded that in a Darwinian world, differences are ultimately a matter of "degree and not of kind."[48]

Perhaps not surprisingly, with this talk of analogous nervous systems, of key structures and tissues shared between flora and fauna, Darwin opened the door for an avalanche of anxiety among his extensive readership. Commentators, looking at the Darwinian plant world, were driven to ask: "Are plants able to think?"[49] "Can plants feel?"[50] "Is there . . . a consciousness in vegetable organisms?" "Are those plants that are endowed with the power of motion as a result of sensation capable of connecting the sensation of touch with their movements by any process of thought? What is thought? . . . Is there any connection between these similar actions of these plants and animals, and if so, are they not due to the same cause?"[51] Edith Thomas, as discussed earlier, imagines a world where a plant is able to defend its actions from charges of infamy by drawing analogies to the means that

humans employ to secure *their* food. On the other hand, Cesare Lombroso found in physiological analogies (pepsin-like digestive acids, reflex actions) the basis for his argument about "the dawn of criminality" in insectivorous plants.

In drawing these powerful analogies between human and plant, Darwin reduced yet another fixed boundary to rubble. As Gillian Beer notes, analogy "by its insistence on underlying similarities tends to support the idea of an orderly universe," where the "meanings" of natural objects square with theological and cultural order.[52] For instance, cultural purveyors of Linnaean botany, which stressed the analogies between plant and human reproductive organs, relied on perceived analogies between flower function (specifically, reproduction) and the behavior of human females to establish and reinforce normative gender behavior. The life of a flower, whose end was "marriage" and reproduction, operated as an exemplar of human behavior, and as Beverly Seaton observes, "flowers were seen as natural allies in the socialization and religious indoctrination" of young girls.[53] Students were taught, for instance, that plants with equal numbers of female and male parts ("brides" and "bridegrooms") entered into lawful "public marriages" and raised floral "children"; "concubines" and "clandestine" unions, as flowers with other combinations of reproductive organs were often called, were suspect.[54] Given the fact that flowers had long been imagined as moral exemplars, especially to young children, it becomes a bit easier to understand the despair and even outrage that accompanied the publication of *Insectivorous Plants*. I will return to that story in a moment.

When Charles Darwin entered the scene, he burst apart the connections cementing moral meanings to natural objects that had been promoted by scientific, sentimental, and erotic flower language. Indeed, flowers were the linchpins in Darwin's attack on static forms and divine design in nature, as attested to by the previously mentioned letter to Asa Gray, in which Darwin conflates the study of *Drosera* and his refusal to accept divine design. Darwin portrayed a natural world where "things are unfocused, fluid, without specific design or fixity, and that . . . slip away from an ever-changing norm."[55] In studies like those into the digestive abilities of insectivorous plants, Darwin replaced certainty with ambiguity, surety with contingency, and the forms and meanings of flowers under the evolutionary lens became plastic and unstable. And of course, although morphology features prominently in evolutionary theory, structure is determined not by design but by an ever-changing and "inextricable web of affinities."[56]

Yet, despite his radical revision of a plant's "activity," Darwin was not immune to the influence of the gender-coded language used by his botanical predecessors, and he surprisingly recapitulates the gendered nature of Linnaean terminology even as he repudiates the fixed structure it represents: he also describes plant "unions" and "marriages" and talks about the "children" that result from such pairings.[57]

However, unlike the metaphors driving Linnaean botany, Darwin's generative metaphorical language dispenses with conventional perception and frames instead new explanatory rubrics: analogy and metaphor, as deployed in the context of evolutionary theory, disrupted the idea of an orderly universe and instead encouraged cultural transformation and the creation of new meanings and orders. Beer notes that Darwin's writing was replete with metaphors and analogies "whose peripheries remain undescribed" and "uncontrolled" and that "lead . . . into profusion and extension."[58] Even further, the "element of obscurity" embedded in evolutionary language "encouraged onward thought; it offered itself for metaphorical application and its multiple discourses encouraged further acts of interpretation."[59] Thus, when Darwin writes of "unions" and "marriages," they carry different meanings than they did in the rigid sexual system of Linnaeus; while Darwin may seem to be rewriting normative gender codes onto flowers, he is in fact stripping away conventional meaning from terms deeply rooted in traditional gendered frames. In doing so, he disrupts expectations in one direction (traditional gender roles), while directing them along another, new evolutionary track. For Darwin, "legitimate" unions occur when a plant successfully cross-pollinates; "illegitimate" unions spring from undesirable self-fertilization.[60] And plants eat living creatures, first luring them with the promise of sweet nectar and then springing deadly traps on their unsuspecting visitors. With Darwin, flowers came into their own as part of, not apart from, the drama of natural selection, since it and not natural theology motivates form. In short, plants live lives that have absolutely nothing to do with humans, their aesthetics, or their poetry, even though Darwin's readers may have had other ideas about this.

"OBSCENE PROCESSES AND PRURIENT APPARITIONS": AESTHETICS, DEGENERATION, AND CARNIVOROUS PLANTS

It may be easy to track and to comprehend the furor and public controversy engendered by *On the Origin of Species* and *The Descent of Man*. But a book about the digestive abilities of plants? One might be tempted to assume that Darwin's botanical work was of interest only to a select group of like-minded scientists. This would be wrong—indeed, the interest shown in even the most seemingly arcane aspects of Darwin's research speaks to the naturalist's dramatic impact on public discourse. Darwin's plant studies in general, and his insectivorous plant work in particular, were aggressively popularized throughout the latter nineteenth century. One can understand professional interest in the organisms, but it may perhaps be harder to understand why reading audiences fell so quickly under the spell of the hidden life of these "murderous plants," avidly following detailed discussions of the plants' mechanisms in the pages of the century's most popular periodicals, such

as *Harper's*, *Scribner's*, and the *Atlantic Monthly*, but also in lesser known publications and even children's magazines.[61] Perhaps this is not surprising, however, since numerous scholars, notably Patricia Okker, have argued that American periodicals of the era gave readers the opportunity to engage directly with the major "social, political, and cultural issues of the day."[62] Periodicals were, moreover, both one of the "main routes by which science was disseminated to the wider public" and a "public arena of debate," where scientific controversy played out.[63] Indeed, if the number of technically proficient, gloriously illustrated articles on carnivorous plants published in popular periodicals is any indication, interest in and controversy about the subject swept through both England and America in the 1870s and 1880s.

The popular fascination with carnivorous plants—and the practical study suggestions offered by many writers—indicates that Darwin's plant studies differed in one key respect from his animal research: This reading public had been primed by early botanical education, by popular mass market flower language books, and especially by leisure-time flower collecting to perform its own research on these plants. Thus, Darwin spoke through these popular articles to a public well versed in botanical matters. And since there are at least forty-five species of carnivorous plants native to North America (typically abundant in boggy marshes), it was easy enough for the magazine reader or amateur botanist to collect samples for home study and comparison—an activity frequently recommended by magazine writers. For instance, an unsigned article in the *Christian Advocate* tells the story of Ella and Prue, two young girls who watch, fascinated and not revolted, through a microscope as the leaf of a sundew devours "the tiny insects drawn by the sweet exudation on its leaves." "The girls were not content," the author tells us, until they "read up all they could about them in the books."[64] An unnamed writer for *Scribner's Monthly* "cordially recommend[s]" that anyone looking to "cheer and enliven a long city winter . . . fill a large pot with the common pitcher plant [which] makes a picture vivid and fascinating."[65] Likewise, an anonymous author in *American Educational Monthly* advises, "the . . . sun-dew is easy to get by anyone in the country who may wish during the coming summer to test the process of devouring."[66] But such eyes-on study was not restricted to country folk: "the common pitcher-plant of the Northern States—is now often for sale on the corners of the city streets by the vendors of ferns . . . and other wild things from the woods."[67] If all else failed, interested readers could rely on the combined power of a growing nursery and seed catalog industry and the rapidly expanding U.S. Postal Service—the "near approach of a mail millenium [*sic*]," in the enthusiastic words of one seed catalog[68]—to make carnivorous plants readily accessible virtually anywhere in the nation.[69] Clearly, the Darwinian debate was restricted neither to the distant halls of Oxford and Cambridge nor to the pages of scientific magazines.

The evolutionary drama was also on display in wild bogs and in parlor window boxes, and popular articles on carnivorous plants encouraged individual participation in the evolutionary dialogue via home study, rather than demanding blind acceptance of Darwinian conclusions.

Such avid support of observational and tactile engagement with natural objects is an early example of the promotion of nature study adopted in the 1890s by Progressive reformers, who argued that robust connections to nature would build "character and 'intellectual freedom,'"[70] "inculcate moral passion and scientific objectivity,"[71] and offset the ills attendant upon urban living.[72] In an era of vanishing frontiers and growing urbanization, such contact with "the wild," even if that wild was reduced to a potted plant on a windowsill, was seen as fundamentally restorative, a potent curative to the "neurasthenia"—the "nervous exhaustion" and "lack of nerve force"—that afflicted overcivilized urban dwellers.[73] Nature study in general, with its healthy attention to physical exercise, fresh air, and outdoor activities, provided an antidote to the physical debilitations of urban living, resulting in a robust "national body" (with, of course, its late nineteenth-century eugenic overtones). Engagement with the wild as represented by carnivorous plants, in particular, promised an even greater cure. With their very coarseness and a physicality manifestly present in the frontier or the woods but essentially lacking in the bursting U.S. cities, the carnivorous plants' "process of devouring," when observed closely, could indeed serve as an effective antidote to the neurasthenia associated with dissipated and decadent urban life.

At the same time, such flower study was potentially destabilizing. John Ruskin, an influential Victorian critic of art and society, accurately pinpointed the source of both the delight and the revulsion variously linked to the Darwinian flower garden. Darwinian botany, he decried, was fascinated with the "obscene processes and prurient apparitions . . . of floral genesis and digestion."[74] As Smith explains, Ruskin's rejection of the "physiological" approach to botany that characterized Darwin's work—as opposed to the "aesthetic" approach that Ruskin preferred—was rooted "deeply in aesthetic and intellectual" issues and concerns. Smith observes: "To connect plants to animals at the levels of reproduction, digestion, and locomotion, was to connect them at their lowest common denominator. To make beauty utilitarian, to put it into the service of deceitfully procuring sex and food, could not be borne."[75] And yet borne it was, and often gleefully, as writers of every stripe reconsidered the traditional interpretative modes that linked flowers to ideal moral states.

Thus, carnivorous plants sprout up with truly surprising persistence in various forms of writing after the publication of *Insectivorous Plants*, including scientific articles, research notes, essays, novels, short stories, and poems, many of which consider the profound transformations of perceived object and alleged meaning

under the Darwinian gaze. As Christine Ladd, an American poet and an eminent mathematician, logician, and psychologist, surveyed the new evolutionary landscape, she saw the vibrant possibilities offered by Darwin's fresh vision of the floral commonwealth. She urged writers, in an essay titled "The Poetry of the Future," to embrace the new wealth of figurative language that awaited them. For Ladd, "old poetic fields have been so well worked and so sparingly fertilized that their productive capacity has become seriously diminished." But if the writer turned instead to "every branch of science," she would discover "vast and fertile tracts which are capable of supporting countless generations of future poets." "If [the poet] is tired of the tame and insipid character of the flora known to literature"—referring to the exhausted tropes of sentimental flower poetry and moral emblems—"let him study the habits of Drosera and Dionaea and the other carnivorous plants." In doing so, poetic language will be revitalized and "give[n] another lease on life."[76] Many writers responded to Ladd's call, and "vast and fertile" metaphorical meanings accrued to insect-eating plants after the publication of *Insectivorous Plants* in 1875. It is thus worth charting the dramatic shift in the literary deployment of carnivorous plants—their "meanings and morals"—before and after 1875.

For writers earlier in the century, such as the transcendentalist and reformer Caroline Healey Dall, the minute details of the *Drosera*'s structure reflected an adherence to natural theology and conformed to the requirements of the sentimental language of flowers popular throughout the earlier part of the nineteenth century, where a plant's appearance was emblematic of ideal Christian behavior and moral imperatives. Thus, for Dall, in 1859, the "topmost bud" of the sundew, expectant of a ray of sunshine to illuminate its halo, waits patiently "through the twelve hours of a single day to open." "If the sun do not shine," she explains, "it withers and drops, and gives way to the next aspirant." Such behavior, Dall concludes, signifies a lesson in "opportunity" for devotion: "So it is with the human heart and its purposes. One by one, they come to the point of blossoming. If the sunshine of faith and the serene heaven of resolution meet the ripe hour, all is well; but if you faint, repel, delay, they wither at the core, and your own crown is stolen from you,—your privilege set aside. Esau has sold his birthright, and the pottage has lost its savor." "Opportunity," she admonishes her reader, "is a rare and sacred thing. God seldom offers it twice."[77] In 1871, the poet H. T. finds "constancy, Faith, patience to bear the frosts of adversity,—Sweet lessons of love, God's gentle message" in the upturned face of the sundew, which "glitters with diamonds . . . at her feet."[78] Apart from such moral considerations, the plants held practical appeal for others, like Will Wallace Harney, an American writer and frontier newspaperman, who notes in 1874 that the pitcher plant, a "marvel of beauty," acts as a natural vase, holding as much as a quart of water and "much sought for by the thirsty traveler."[79]

But consider what happens after the discovery that the plants ingest meat. The narrator of Mary Mapes Dodge's poem "Carnivorous Plants" (1875) queries her gardener friend:

> What's this I hear
> My Molly dear,
> About the new carnivora?
> Can little plants
> Eat bugs and ants
> And gnats and flies?—
> Why,—bless my eyes!
> Who is the great diskiverer?
>
> Not Darwin, love,
> For that would prove
> A sort of retrograding;
> Surely the fare
> Of flowers is air
> Or sunshine sweet.
> *They* shouldn't eat
> Or do aught so degrading.[80]

Evelyn Pyne wanders "for ever amid criminals" in a "Garden of Death" in 1891, encountering "degraded," "indescribably repulsive" organisms from which "all fairness had fled, leaving only grotesque forms and impure coloring." Pyne watches the "terrible transformation" of the *Drosera* from "pure spirit" to "animal nature," as the plant consumes an "imprisoned insect" amid "a torrent of *apparent* tears" and "*assumed* grief."[81] World traveler Eliza Scidmore in 1897 recalls of the pitcher plant that she shunned the "water" of the plant's "pelican pouch," calling it an "evil-looking, ill-smelling, sticky thing," which "haunt[s]" the memory of her travels in Java.[82] William Hamilton Gibson describes the "bacchanal sarracenia" that "lifts its fated cup" in his essay "Across Lots" (1882). "Strange tyrant!," he decries. "How livid the downcast face of that hideous flower, that stalks among its lairs, and seems to gloat upon the victim of its poisoned cups! Here is a pit whose depths are yet unfathomed, a fated leaf whose deadly secret has been sought in vain, a charnel-house from which no voice has yet been heard." Gibson records his unease with the plant's shift from moral emblem to murderer: "Who cast this cruel spell upon our delicate drosera that impels this life of carnage, and yet bedews its fringes with incessant weeping?"[83] And finally, where flowers had, earlier in the nineteenth century and before, been seen as emblematic of idealized female behavior, the true relation of flowers and women was revealed, it seemed, in the grasping nature of the carnivorous plant—at least for satirist Edgar Lee Masters, whose bitter narrator in the poem "Jim and Arabel's Sister" imagines having the life sucked out of

him by a woman, just as the sundews and pitcher plants suck the life out of their hapless victims:

> You'll find among the marshes
> The sundew and the pitcher plant; . . .
> . . . The sundew catches
> The midges flitting by with rainbow wings,
> Impales them on its tiny spines, in time,
> Devours them. . . . *The pitcher plant and the sundew . . .*
> *Well typify the nature of most women*
> *Who must have blood or soul of man to live.*[84]

Clearly, the plants that so blatantly subverted the hierarchy of nature by ingesting their insect relations offered to some an irresistible opportunity to inject new life into the increasingly vapid world of flower poems. Flowers equal sex, as Linnaeus taught. Darwin added violence to the picture, and post-1875 writers explored a darker world that was both implicitly sexually charged *and* explicitly violent. The kind of degenerate sexuality represented by Masters's poem also links to discourses of "degeneration" more broadly in the period, in which, as William Greenslade explains, "fear and anxiety extended to sexuality, particularly fear of female sexuality by men."[85] No longer emblematic of ideal, domestic female behavior, flowers have "reversed the order of nature," in the words of Mary Treat.[86] Masters capitalizes on the new floral language at his disposal, as Ladd recommends, and uses flowers to represent the "reversion to lower states of animality [that] signified the uncontrollable mystery of female desire."[87]

While some writers, such as Masters, were content to play with darker gendered readings of plants, many other writers confronted more directly the unsettling consequences of Darwin's fundamental remapping of the natural world as a place where seemingly static borders now blurred and eroded. At the very least, Darwin startled a fascinated public into recognizing that the terms of evolution leveled the playing field and placed humans and nonhumans on equal footing in the mechanisms of nature. Darwinian evolution denied design in nature, denied special creation, denied polygenism. All organisms shared a common past, and only contingency and momentary fitness determined evolutionary "progress." Thus, fears of retrograde motion—of degeneration from an ideal evolutionary state (if such a thing could be said to exist)—developed hand in hand with concepts of evolutionary order. Max Nordau, the German eugenicist who wrote one of the most comprehensive and influential treatises on degeneration in 1892, understood degeneration as a biological pathology, a condition of evolutionary atavism, where the degenerate individual was a "'throwback' to an earlier period of evolutionary 'development.'"[88]

Degeneration, as a trope, as an "organizational scheme," and as a "discursive

mode," pervaded nineteenth-century discourses (artistic, biological, historical) perhaps, as J. Edward Chamberlain and Sander Gilman argue, because "with the idea of degeneration they [scientists, theologians, and writers] came closest to the sanctity of types, or genuses, or species, a sanctity that was the more frantically embraced as it became uncertain."[89] Degeneration, in describing "processes and forces" acting on structure and character ("deviation from an original type" and "deviation from a norm of behavior"), provided convenient categories to comprehend a world where "not just the autonomy of species, but their very authority as entities, was called into question,"[90] a point, as previously noted, that John Lindley made in response to Darwin's plant research. In an example of this interpretative move, as described by Nancy Stepan, degeneracy was comprehended "as a *process*" that indicated "decay within the limits set by . . . type." An individual "placed outside his 'proper' place in nature . . . could undergo . . . 'degeneration,' causing the appearance of atavistic or evolutionarily even more primitive behaviors and physical structures."[91]

This reversion to an atavistic state resonates at both the actual and metaphorical level when we return to our "brother-organisms," insectivorous plants. When the economist Walter Bagehot deployed the word "atavism" in 1872 to describe "the return . . . to the unstable nature of . . . barbarous ancestors," he inflected the term with "scenes of cruelty and horror," describing it as "the outbreak of inherited passions long repressed by fixed custom, but starting into life as soon as that repression was catastrophically removed."[92] Robert Nye understands this outbreak of repressed passions associated with both atavism and degeneration as "a catastrophically reduced ability to resist 'impulsions' of instinct," which drives the degenerate to participate in immoral or, in Lombroso's terms, "instinctively cruel" criminal acts.[93] Such a description equally fits the case of sundews and other insectivorous plants, especially in a world marked by shared instincts and habits. Sundews "live by actual violence";[94] they are not "beautiful, or good, or modest, or retiring, but simply and solely . . . atrociously and deliberately wicked."[95] Here, carnivorous plants represent the decay of moral order.

At the same time, the fundamental amorality of the "act of devouring"—the plants are, after all, only doing as they are compelled to by biological and environmental conditions—struck an undeniable chord in a nation struggling to reimagine itself, riven as it was by the violent legacy of the Civil War, by the mechanization and industrialization of a previously agrarian, frontier nation, and by a new economy marked by the gross accumulation of capital by a small and seemingly ruthless brand of laissez-faire, evolutionarily minded capitalists. Theodore Dreiser, for instance, saw the connections between the "humble" sundew and the workings of U.S. capitalists: at the end of *The Financier* (1912), his monumental novel of the rise, fall, and (economic) redemption of a model robber-baron, Dreiser naturalizes the actions of the capitalist by equating them with the "natural" actions of the

Drosera and that master of camouflage, the black grouper (a fish). Dreiser writes: "That very subtle thing which we call the creative power, and which we endow with the spirit of the beatitudes, is supposed to build this mortal life in such fashion that only honesty and virtue shall prevail. Witness, then, the significant manner in which it has fashioned . . . the lovely Drosera (Sundew) using its crimson calyx for a smothering-pit in which to seal and devour the victim of its beauty."[96]

Throughout the text, Frank Cowperwood, the financier of the title, succeeds by rejecting the morally inflected behaviors that characterized his father's generation: gratitude, loyalty, fidelity. Cowperwood instead represents the mercenary adaptiveness that characterized late nineteenth-century U.S. capitalism. As Bruce Robbins explains: "What we see here [in finance capitalism] is neither amorality nor conventional morality." Rather, he argues, Cowperwood and his ilk represent "an unconventional morality—not the absence or negation of morality, but rather a proto-principle, not yet agreed upon, not yet conventional."[97] Dreiser indeed wonders: Who or what is the new god of this proto-principle? "What would you say was the intention of the overruling, intelligent, constructive force which gives to [the black grouper and *Drosera*] this ability? To fit it to be truthful? To permit it to present an unvarying appearance which all honest life-seeking fish may know? Or would you say that subtlety, chicanery, trickery, were here at work? An implement of illusion one might readily suspect it to be, a living lie, a creature whose *business* it is to appear what it is not . . . to get its living by great subtlety, the power of its enemies to forfend against which is little. The indictment is fair." In Dreiser's deterministic universe, where the financier is both ruthlessly destroyed by his competitors and ruthlessly destroys them in turn, the "Ten Commandments" are little more than "the illusion of justice," the "beatitudes" merely "dreamed."[98]

And yet again, no singular narrative or meaning can be applied to the metaphorical potential of insectivorous plants. While male commentators appeared fundamentally disturbed by the radical transformation of the plant from passive object to active subject, many women writers and naturalists seem to have embraced the overturning of traditional, gendered visions of the moral floral commonwealth under the evolutionary rubric. As noted, Christine Ladd reveled in the metaphorical potency of scientifically inflected poetry "of the Future," which renders impotent the "insipid" language of sentimental flower poetry. Perhaps even more surprising than these metaphorical, literary transformations, carnivorous plants opened up an avenue for the *scientific* study of carnivorous plants, which was exploited by women who successfully used the plants in pursuit of standing as *botanists*. Rebecca Merritt Austin, a miner's wife living in the camps of Sierra Nevada, not only collected and sold botanical specimens to augment her husband's meager income, she corresponded with botanists at Harvard and shared with them her original discoveries on the fluids secreted by the carnivorous plant *Darlingtonia californica*.[99] Mary Elizabeth Barber of South Africa (who also

lived in mining camps) corresponded with professional botanists, notably Joseph Hooker, and published articles on carnivorous plants native to her locale. Sophie Bledsoe Herrick, an author, editor, and Darwin correspondent, investigated carnivorous plants and published her findings in the *Century* and *Scribner's*. Perhaps most significant of all is Mary Treat, one of the most prolific naturalists and nature writers of the late nineteenth century and one of the very few to make a comfortable living from her books and articles. Treat, working with specimens found near her New Jersey home, produced some of the most advanced observations on insectivorous species, especially the aquatic *Utricularia*. Asa Gray wrote to Darwin about Treat, and Darwin sought her out to perform observations that would later appear in *Insectivorous Plants*.

Treat, who made her professional reputation with carnivorous plants, fully understood the profoundly transformative potential of them. In her best-selling collection of essays, *Home Studies in Nature* (1885), Treat observes, in the opening of her article "Utricularia Clandestina," that carnivorous plants "seem to have reversed the regular order of nature" and become "avengers of their kingdom," turning "upon animals, incarcerating and finally killing them."[100] At the end of her essay on the pitcher plant *Sarracenia variolaris*, Treat reminds her readers that such transformations can only be understood through a Darwinian lens: carnivorous plants have been "shown" by Darwin "to have become transmuted into a love of sentient life." Treat gives her plants "tongues," and they recite, almost verbatim, lines from Erasmus Darwin's *Loves of the Plants*. But when these plants invite "silver butterflies" and "painted moths" to rest, the insects find not the "mossy-beds" of erotic flower poetry, but the "clasping beds" of hard scientific fact.[101]

Treat, as a successful woman naturalist, likewise appears to reverse the "regular order of nature" in her scientific investigations. In a dramatic reversal of the sentimental woman turning to nature for moral lessons, Treat confesses to finding herself "very much *amused* in watching a water-bear . . . entrapped" in the "elegant" chamber of an aquatic insectivorous plant, heedlessly wandering around before it was "entrapped and killed and slowly macerated."[102] Treat, like Edith Thomas and others, questions the applicability of moral narratives to any organism operating under the evolutionary rubric. And like Thomas, Treat refuses to pass judgment on the plant's actions. On the *Utricularia*, she "leave[s] . . . the reader" to "judge" "whether the plants are really hungry and entrap the animals for food, or whether it is only an example of the wanton destructiveness of nature."[103] Treat breaks from the sentimental flower language of her female predecessors, rejecting fixity in favor of flux. She refuses to anchor the plant to one "meaning"; nor will she take on the role of moral arbiter, preferring instead to let her reader account for the plant's motives. Her language is exploratory, as indicated by her repeated use of the hypothetical ("seem," "whether," "perhaps," "appearances") to describe possible explanations of the plant's behavior. Notably, such use of language aligns her

Figure 4. Pitcher plant (*Sarracenia variolaris*).
From Mary Treat, *Home Studies in Nature*, 189.

with Darwin, who describes the natural world as an "inextricable web of affinities" prone to the contingencies of the conditional, the "if," "when," "were to be," and "could be" of any given process.[104]

Such conditional language reveals how remarkably open many observers and participants in evolutionary debates were to considering both the literal and metaphorical implications of the revolutionary theory. It is true that Darwin's insectivorous plant studies confirmed that the world of ruthless competition extended to all forms of life. Naturally, many were horrified by floral carnivory and were profoundly anxious about the implications of a world of blurred boundaries and plastic forms. These commentators preferred to read in insectivorous plants a narrative of degeneration and criminality—a precipitous descent from an ideal type. For them, these lovely plants had transformed into murderous and wicked beasts and showed themselves akin to humans at their worst, instead of showing how humans should be at their best. Others, though, took advantage of Darwin's fundamental remapping of the natural world and sought to fashion new, exploratory, and transformative narratives under the evolutionary rubric. Ultimately, what drove carnivory in plants *mattered* to evolutionarily minded commentators because they saw in these plants a version of their own history. As one anonymous commentator put it: "The life of plants is one with that of animals and with that of ourselves. . . . Their sense of life is primitive form, the beginnings of the human mind."[105]

NOTES

1. Erasmus Darwin, *The Loves of the Plants, with Philosophical Notes*, vol. 2 of *The Botanic Garden* (1790; rpt., New York: Garland, 1978), 143. For a comprehensive account of Darwin's taxonomic poem, see Janet Browne, "Botany for Gentlemen: Erasmus Darwin and *The Loves of the Plants*," *Isis* 80, no. 4 (1989): 592–621.

2. Charles Darwin, *Insectivorous Plants*, in *The Works of Charles Darwin*, vol. 24, ed. Paul H. Barrett and R. B. Freeman (New York: New York University Press, 1989), 2.

3. Cesare Lombroso, *Criminal Man*, ed. Mary Gibson and Nicole Hahn Rafter (Durham, N.C.: Duke University Press, 2006), 168. Lombroso added this passage to the third edition of his book in 1884. See editor's note, 161.

4. J. G. Hunt, "Natural History Studies," *Friends' Intelligencer* 39, no. 1 (Feb. 18, 1882): 10.

5. Lombroso, *Criminal Man*, 168.

6. Anatole France, "Criminality of Plants," *New York Times* (July 7, 1895): 26.

7. *Friends' Intelligencer* 41, no. 5 (Mar. 15, 1884): 72.

8. William Bartram, *The Travels of William Bartram*, qtd. in Charles Nelson, *Aphrodite's Mousetrap: A Biography of Venus's Flytrap with Facsimiles of John Ellis' Original Pamphlet and Manuscripts* (Kilkenny, Ireland: Boethius, 1991), 49–50. Charles Darwin discusses both design and the *Drosera* in a famous letter to Asa Gray. Darwin confesses that he "cannot honestly go as far as [Gray does] about Design." Charles Darwin to Asa Gray, Nov. 26,

[1860], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2998 (accessed Sept. 3, 2012).

9. William P. C. Barton, "Memorandum concerning a New Vegetable Muscipula," *Transactions of the American Philosophical Society* 6 (1809): 79–82.

10. Daniel L. McKinley, "'Wagish Plant as Wagishly Described' John Bartram's Tipitiwitchet: A Flytrap, Some Clams and Venus Obscured," qtd. in Nelson, *Aphrodite's Mousetrap*, 125–45, 128–29.

11. Mary Treat, *Home Studies in Nature* (New York: American Book Company, 1885), 187.

12. Charles Darwin to Joseph D. Hooker, Nov. 21, [1860], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2991; Charles Darwin to Charles Lyell, Nov. 24, [1860], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2996 (both accessed Sept. 2, 2012).

13. Peter Ayers, *The Aliveness of Plants: The Darwins at the Dawn of Plant Science* (London: Pickering and Chatto, 2008), 79. Ayers provides the most detailed discussion of Darwin's plant studies and their relationship to the field of experimental plant physiology in the nineteenth century. See also Richard Bellon, "Charles Darwin Solves the 'Riddle of the Flower'; or, Why Don't Historians of Biology Know about the Birds and the Bees?," *History of Science* 47, no. 4 (2009): 373–406.

14. Several critics, such as Jonathan Smith and David Kohn, have argued that scholars have largely overlooked Darwin's plant studies. See Smith, *Charles Darwin and Victorian Visual Culture* (New York: Cambridge University Press, 2006), 137; and Kohn, *Darwin's Garden: An Evolutionary Adventure* (New York: New York Botanical Garden, 2008), 9. For a discussion of Darwin's botany and Victorian poetry, see Jonathan Smith, "Une Fleur du Mal?: Swinburne's 'The Sundew' and Darwin's *Insectivorous Plants*," *Victorian Poetry* 41, no. 1 (2003): 131–50. The topic is receiving greater attention in part because of the print and online publication of Darwin's correspondence, a significant portion of which deals with his botanical studies. See the Darwin Correspondence Project, www.darwinproject.ac.uk.

15. Elizabeth Keeney, *The Botanizers: Amateur Scientists in Nineteenth-Century America* (Chapel Hill: University of North Carolina Press, 1992), 1.

16. Beverly Seaton, *The Language of Flowers: A History* (Charlottesville: University of Virginia Press, 1995), 32.

17. Smith, *Charles Darwin*, 141.

18. Charles Darwin, *On the Origin of Species*, 4th ed. (London: John Murray, 1869), 239.

19. Caroline A. Creevey, "Botany as a Recreation," *Harper's Bazaar* 25, no. 26 (June 25, 1892): 510.

20. Whitney Davis, "Decadence and the Organic Metaphor," *Representations* 89 (Winter 2005): 131–49, 134. See also Bellon, "Charles Darwin," 374.

21. Smith, *Charles Darwin*, 141.

22. Hunter Dupree, introduction to Asa Gray, *Darwiniana: Essays and Reviews Pertaining to Darwinism* (Cambridge, Mass.: Belknap, 1963), xix.

23. "A Cannibal Plant," *Littell's Living Age* 77, no. 2479 (Jan. 2, 1892): 61–63, 63.

24. Dupree, *Darwiniana*, xix.

25. Charles Darwin to Asa Gray, Aug. 4, [1863], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-4262 (accessed Nov. 5, 2012).

26. Sophie Herrick, "Hours with the Microscope: Pond Life," *Scribner's Monthly* 14, no. 2 (June 1877): 151–61, 152.

27. William Greenslade, *Degeneration, Culture, and the Novel, 1880–1940* (New York: Cambridge University Press, 1994), 15–16.

28. J. Edward Chamberlain, "Images of Degeneration: Turnings and Transformations," in *Degeneration: The Dark Side of Progress*, ed. J. Edward Chamberlain and Sander L. Gilman (New York: Columbia University Press, 1985), 263–89, 265.

29. Greenslade, *Degeneration*, 16.

30. Ibid., 2.

31. Anne McClintock, *Imperial Leather: Race, Gender, and Sexuality in the Colonial Contest* (New York: Routledge, 1995), 187.

32. Edith M. Thomas, "Notes from the Wild Garden," *Atlantic Monthly* 68, no. 406 (Aug. 1891): 172–78, 177.

33. See Emma Darwin to Charles Darwin [Apr. 19, 1851], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-1405, and Charles Darwin to Emma Darwin [Apr. 21, 1851], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-1408 (both accessed Nov. 5, 2012).

34. Darwin first began studying the *Drosera rotundifolia* after finding the plant in a Sussex bog. Janet Browne provides a compelling reading of these early studies as representing "interlocking" "preoccupations" over his daughter's health as well as his own. She writes: "The question of stomachs persistently seeped into his thoughts—Henrietta's stomach, his own stomach, leaves as stomachs. . . . To investigate his leaves was to search for the essence of the Darwin family weakness, the bane of his life." Browne, *Charles Darwin: The Power of Place* (Princeton, N.J.: Princeton University Press, 2002), 147. See also Charles Darwin to Joseph D. Hooker, July 29, [1860], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2880 (accessed Nov. 5, 2012). He begins the letter: "My dear Hooker We have had Sir H. Holland here to see Etty again, & to our great grief he tells us the fever has left mischief in the abdomen with some fluid accumulated, but thank God not much. He is tolerably sanguine for her ultimate recovery; but it will be very long. We have had a miserable time of it, but are now more composed & hopeful. . . . Latterly I have done nothing here; but at first I amused myself with a few observations on the insect-catching power of Drosera; & I must consult you sometime whether my 'twaddle' is worth communicating to Linnean Soc."

35. Charles Darwin, *Climbing Plants*, in *The Works of Charles Darwin*, vol. 24, ed. Paul H. Barrett and R. B. Freeman (New York: New York University Press, 1988), 127.

36. See, for instance, Charles Darwin to Joseph D. Hooker [Aug. 31, 1860], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2886 (accessed Nov. 5, 2012); Darwin, *Insectivorous Plants*, 27.

37. Charles Darwin to Asa Gray, Mar. 11, [1873], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-8806 (accessed Nov. 5, 2012). See also Charles Darwin to Joseph D. Hooker, Nov. 26, [1860], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-2999; Charles Darwin to Joseph D. Hooker, Dec. 4, [1860], http://www.darwinproject.ac.uk/entry-3008; Charles Darwin to Edward Cresy, Sept. 15, [1862], http://www.darwinproject.ac.uk/entry-3008; and Charles Darwin to Asa

Gray, Aug. 4, [1863], http://www.darwinproject.ac.uk/entry-4262 (all accessed Oct. 28, 2012).

38. Darwin to Lyell, Nov. 24, [1860], emphasis added.

39. Darwin to Gray, Nov. 26, [1860].

40. Darwin, *Insectivorous Plants*, 13, 2, 12.

41. Joseph D. Hooker, "Address to the Department of Zoology and Botany, 1874," in *Report of the Forty-Fourth Meeting of the British Association for the Advancement of Science* (London: John Murray, 1875), 102–16, 103, emphasis added.

42. Ayers, *Aliveness of Plants*, 89.

43. Ibid., 92.

44. Darwin, *Insectivorous Plants*, 99–100.

45. Ibid., 273, 26, 128, emphasis added.

46. Charles Darwin to Joseph D. Hooker, Sept. 26, [1862], in Darwin Correspondence Database, http://www.darwinproject.ac.uk/entry-3738 (accessed Sept. 9, 2012).

47. Qtd. in Ayers, *Aliveness of Plants*, 75.

48. Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (London: John Murray, 1871), 1:105.

49. Anonymous, "Are Plants Able to Think?," *Current Literature* 29, no. 3 (Sept. 1900): 338.

50. G. Clarke Nuttall, "Can Plants Feel?," *Living Age* 29, no. 3203 (Nov. 25, 1905): 471.

51. Anonymous, "Plants That Seem to Think," *Current Literature* 15, no. 3 (Mar. 1894): 265. This essay was widely republished, appearing in the *New York Times*, *Current Opinion*, *New York Weekly*, and even *Our Paper*, a newspaper produced by prisoners in the Massachusetts Reformatory in Concord.

52. Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction*, 2nd ed. (New York: Cambridge University Press, 2000), 76.

53. Seaton, *Language of Flowers*, 33. For an account of the moral dimensions of botanical education in America, see Tina Gianquitto, *"Good Observers of Nature": American Women and the Scientific Study of the Natural World, 1820–1885* (Athens: University of Georgia Press, 2007), 15–56.

54. Theresa M. Kelley, *Clandestine Marriage: Botany and Romantic Culture* (Baltimore, Md.: Johns Hopkins University Press, 2012), 33. See also Ann Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England 1760–1860* (Baltimore, Md.: Johns Hopkins University Press, 1996), 13–32; and Amy King, *Bloom: The Botanical Vernacular in the English Novel* (New York: Oxford University Press, 2003), 11–47.

55. James Krasner, *The Entangled Eye: Visual Perception and the Representation of Nature in Post-Darwinian Narrative* (New York: Oxford University Press, 1992), 34.

56. Charles Darwin, *On the Origin of Species* (London: John Murray, 1859), 434.

57. Charles Darwin, "On the Character and Hybrid-Like Nature of the Offspring from the Illegitimate Unions of Dimorphic and Trimorphic Plants," *Journal of the Linnean Society of London, Botany* (1868) 10: 393–437 (read Feb. 20, 1868).

58. Beer, *Darwin's Plots*, 7.

59. Ibid., 92–93.

60. Charles Darwin, *The Different Forms of Flowers on Plants of the Same Species*, in *The*

Works of Charles Darwin, vol. 26, ed. Paul H. Barrett and R. B. Freeman (New York: New York University Press, 1989), 17.

61. Raoul Heinrich Francé, *Germs of Mind in Plants* (Chicago: Kerr, 1905), 49. Two anthologies provide a useful overview of the many kinds of carnivorous plant fiction popular after the publication of *Insectivorous Plants*: Chad Arment, ed., *Flora Curiosa: Cryptobotany, Mysterious Fungi, Sentient Trees, and Deadly Plants in Classic Science Fiction and Fantasy* (Landisville, Pa.: Coachwhip, 2008); and Chad Arment, ed., *Botanica Delira: More Stories of Strange, Undiscovered, and Murderous Vegetation* (Landisville, Pa.: Coachwhip, 2010).

62. Patricia Okker, *Social Stories: The Magazine Novel in the Nineteenth Century* (Charlottesville: University of Virginia Press, 2003), 5.

63. Sally Shuttleworth and Geoffrey Cantor, introduction to *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals*, ed. Geoffrey Cantor and Sally Shuttleworth (Cambridge, Mass.: MIT Press, 2004), 2, 4.

64. Anonymous, "Insect-Eating Plants," *Christian Advocate* 58, no. 36 (Sept. 7, 1893): 578.

65. Anonymous, "Home and Society: Pitcher Plant," *Scribner's Monthly* 3, no. 6 (Apr. 1872): 750–53, 752.

66. Anonymous, "Carnivorous Flowers," *American Educational Monthly* (July 1875): 313.

67. Ibid.

68. Anonymous, "Talks with Our Readers," *Flower Garden* (Jan. 1, 1873): 83. The author of this piece describes the "mail millenium" as "a period when we may all enjoy the fruits of easy, expeditious and safe transportation of seeds, plants and flowers through every part of the whole country."

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71. Kevin C. Armitage, "Bird Day for Kids: Progressive Conservation in Theory and Practice," *Environmental History* 12 (July 2007): 528–51, 528.

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73. David Weir, *Decadent Culture in the United States: Art and Literature against the Grain, 1890–1926* (Albany: State University of New York Press, 2008), 6.

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82. Eliza Scidmore, "Java and Singapore: Down to Java," *Century* 54, no. 4 (Aug. 1897): 527–46, 544.

83. William Hamilton Gibson, "Across Lots," *Harper's New Monthly Magazine* 65, no. 390 (Nov. 1882): 847–61, 859.

84. Edgar Lee Masters, "Jim and Arabel's Sister," in his *Songs and Satires* (New York: Macmillan, 1916), 114, emphasis added.

85. Greenslade, *Degeneration*, 18.

86. Treat, *Home Studies in Nature*, 139.

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88. Max Nordau, as qtd. in Weir, *Decadent Culture*, xiv.

89. J. Edward Chamberlain and Sander Gilman, "Degeneration: An Introduction," in *Degeneration: The Dark Side of Progress*, ed. J. Edward Chamberlain and Sander Gilman (New York: Columbia University Press, 1985), xi, x.

90. Ibid., x; J. Edward Chamberlain and Sander Gilman, "Degeneration: A Conclusion," ibid., 290–94, 293.

91. Nancy Stepan, "Biology and Degeneration: Races and Proper Places," in Chamberlain and Gilman, *Degeneration*, 97–120, 98.

92. Walter Bagehot, *Physics and Politics; or, Thoughts on the Application of "Natural Selection" and "Inheritance" to Political Society* (New York: Appleton, 1873), 154–55.

93. Robert Nye, "Sociology and Degeneration: The Irony of Progress," in Chamberlain and Gilman, *Degeneration*, 49–71, 60; Lombroso, *Criminal Man*, 223.

94. Anonymous, "Predatory Plants," *Advance* 18 (Sept. 27, 1883): 648.

95. [Grant Allen], "Queer Flowers," *Cornhill*, n.s., 3 (1884): 404, republished in the *New York Times* as "Not a Poetical Plant" (Nov. 2, 1884): 12.

96. Theodore Dreiser, *The Financier*, ed. Roark Mulligan (Urbana: University of Illinois Press, 2010), 554.

97. Bruce Robbins, "Can There Be Loyalty in *The Financier*?: Dreiser and Upward Mobility," in *The Cambridge Companion to Theodore Dreiser*, ed. Leonard Cassuto and Clare Virginia Eby (New York: Cambridge University Press, 2004), 112–26, 124.

98. Dreiser, *Financier*, 554–55, emphasis added.

99. See Dawn Sanders, "Behind the Curtain: Treat and Austin's Contributions to Darwin's Work on Insectivorous Plants and Subsequent Botanical Studies," *Jarbuch fur Europaische Wissenschaftskultur* 5 (2009–2010): 285–98.

100. Treat, *Home Studies in Nature*, 139.

101. Ibid., 202–3. See also Gianquitto, *Good Observers*, 175–76.

102. Treat, *Home Studies in Nature*, 143, 144, 145, emphasis added.

103. Ibid., 139.

104. Darwin employs such conditional language in *Insectivorous Plants* to hypothesize the possible "steps" of natural selection that led to the evolution of the digestive mechanisms in these plants: "*If* such exudation . . . did ever occur, the solvent *would* act on the animal matter contained within the captured insects. . . . As it cannot be doubted that this process would be of high service to plants growing in very poor soil, it *would tend* to be perfected through natural selection. Therefore, any ordinary plant having viscid glands, which occasionally caught insects, *might* thus be converted under favourable circumstances into a species capable of true digestion. It ceases, therefore, to be any great mystery how several genera of plants, in no way closely related together, have independently acquired this same power." (*Insectivorous Plants*, 362–63, emphases added).

105. Anonymous, "Beware, Oh, Ye Vegetable Eaters!," *New York Tribune* (Oct. 25, 1909): B7.

GILLIAN FEELEY-HARNIK

Bodies, Words, and Works

Charles Darwin and Lewis Henry Morgan on Human-Animal Relations

While darwin argued in *On the Origin of Species* (1859) that "descent is the hidden bond of connection," linking all the earth's creatures, extinct and living, the American lawyer-ethnologist Lewis Henry Morgan argued in *Systems of Consanguinity and Affinity of the Human Family* (1871) that "systems of relationship" link all "the great families of mankind," showing that they constitute one human family. With *Origin*, Darwin founded evolutionary biology. With *Systems*, Morgan invented kinship, the analysis of family relationships from a comparative and historical perspective.[1] With kinship, Morgan founded the discipline of anthropology in the United States. The genealogical unity of all humankind is the common framework for the comparative analysis of human variation and change in anthropology.

Darwin (1809–82) and Morgan (1818–81) were contemporaries. Socially, they occupied the same broad, transatlantic field of Anglo-American relations. Historically, their discoveries of the genealogical connections linking all living creatures, and linking all humankind, were almost simultaneous. Logically, from a Darwinian perspective, they should be related. Darwin's hidden bond of descent includes humankind, even if he didn't make this explicit until his *Descent of Man* (1871), published in the same year as Morgan's *Systems*. Yet Morgan's *Systems* complicates the logic of the connections that might exist between the two men because the genealogical relationships he documented were based on linguistic not anatomical data, and neither can be reduced to the other.

Morgan's correspondence, the inventory of the books he and his wife bought for their library, his papers and publications all show that he, like Darwin, was concerned in the 1850s–1870s with systems of relationships among humans and nonhuman animals currently and historically. He probably heard of Darwin's *Origin* in 1859 or 1860, even though he bought Huxley's *Origin of Species* (1863)

before he finally bought Darwin's *Origin* in 1865. Despite their common interests, Morgan seems to have seen Darwin's work as one among several sources of data and ideas that he was trying to integrate. Scholars of Morgan's work argue that Darwin's ideas had no direct influence on Morgan's *Systems* (1871) or his *Ancient Society* (1877). Even the conceptions of evolution he presented in the last chapter of *Systems* and throughout *Ancient Society* are derived more from philosophers of the Enlightenment period than from Darwin.[2]

Yet Morgan's work illuminates the complexities of Darwin's influence across the sciences and arts in the United States in the mid-nineteenth century for two reasons. Their shared interests in the biogeography and history of organisms, and their transformations over time, highlight how the men's views diverged in association with the different forms of political-economic expansion in which they, living in Great Britain and the United States, were involved. The second reason is less obvious: both Darwin and Morgan were concerned with instinct and intelligence in animals and their consequences for historical and evolutionary change.

Darwin's *Descent of Man* is well known for arguing that human beings are subject to natural selection like any other animal, and that nonhuman animals feel, remember, will, and reason like humans, just differently in degree; natural selection acting on instincts produces intelligence. Morgan's *American Beaver and His Works*, published in 1868 and sent to Darwin that same year, makes a similar but even stronger argument.[3] Instinct is analytically meaningless. Human and nonhuman animals share intelligence variably according to their adaptations in life. A full understanding of the "powers and capacities" of intelligence therefore requires research among "the members of the animal kingdom as a whole" (*American Beaver*, 280). *The American Beaver* is admittedly the more obscure work. Morgan himself published his studies of humans and beavers separately. In retrospect it seems as if his contemporaries—embroiled in debates over permanence and change in species of all kinds, ensouled and otherwise—were as reluctant to merge them as were Morgan and Morgan's intellectual successors over the past century or so.

Morgan's works have a divided readership even within anthropology. Most anthropologists across the four subfields (social-cultural, linguistic, archaeological, and biological) know only Morgan's work on humans, and four of those publications in particular will figure in this essay. They are the already mentioned *Systems of Consanguinity and Affinity of the Human Family* (1871, but completed and submitted to the Smithsonian Institution in 1868), which established the comparative study of kinship in anthropology; *League of the Ho-dé-no-sau-nee, or Iroquois* (1851), an outstanding historical ethnography of Iroquois in New York state; *Ancient Society* (1877) on human social evolution, respected in its day but since denigrated as conjectural history; and *Houses and House-Life of the American Aborigines* (1881), a historical analysis of Native American forms of hospitality and sociality based on archaeological data.

Biologists know only Morgan's work on animals, mainly *The American Beaver and His Works*. Robert J. Naiman, a zoologist and ecologist specializing in land-water interactions and the analysis and restoration of river systems, inspired Dover to publish in 1986 a new facsimile edition of Morgan's beaver book with the subtitle "A Classic of Natural History and Ecology."

The comparative psychologists Philip Howard Gray and Timothy D. Johnston are alone in naming Morgan among a handful of pioneers in the study of animal behavior in Europe and North America since the late 1660s. In Johnston's view, historians of psychology overlook work prior to Williams James's *Principles of Psychology* (1890). They trace the origins of psychology comparing humans and other animals to Darwin's influence on George J. Romanes. Johnston argues that Morgan, John Bascom, and Joseph LeConte, three "pioneers of comparative psychology," were ignored by the self-declared "New Psychologists" of the 1880s and 1890s in America, including William James, because such work was identified with speculative anecdotal philosophizing contrary to experimental inquiry on the German model.[4]

Morgan's papers on animal behavior of 1843 and 1857 fit this description, as we will see. Yet his monograph *The American Beaver and His Works* was unique in its time and for decades afterward for being grounded in the careful observations of an ethnographer doing systematic, long-term fieldwork. His earliest paper was written when his interests in humans and other animals were distinct, but the second was written when he was two years into recurrent research trips to northern Michigan in 1855–66, which were combined in the summers of 1859–62 with trips farther west to Kansas and Nebraska, the upper reaches of the Red River of the North to Fort Garry, and still farther west via the Missouri River into the foothills of the northern Rockies. His fieldwork journals and his correspondence show that his research during those years involved the same people, working as trappers, surveyors, guides, and cooks for iron miners and railroad builders in northern Michigan and in towns so far out on the western frontier that they were run by John Jacob Astor's American Fur Company and its successors. The beavers proved to be Morgan's intelligent, yet mute witnesses to what he came to see as the self-destruction at the heart of civilization, the height of human achievement.

Darwin and Morgan met once in the midst of their labors. Their meeting is my point of departure.

MORGAN AND DARWIN

On February 2, 1860, the daily *Rochester Union and Advertiser* ran the first local notice of the American edition of Darwin's *Origin of Species*.[5] Since August 1855, Morgan had been traveling to northern Michigan for legal work while pursuing his human and beaver research on the side, and since August 1856, he had joined Asa Gray, Louis Agassiz, and other professional naturalists at annual meetings of the

American Association for the Advancement of Science. Gray's supportive reviews of *Origin* appeared throughout 1860: in the *American Journal of Science and Arts* for March and September and the *Atlantic Monthly* for July, August, and October; Agassiz's critique appeared in the *American Journal of Science and Arts* for July 1860. Gray's debates with Agassiz and other colleagues at special meetings of the American Academy of Arts and Sciences in March and May, which were called to discuss Darwin's theories, were published shortly afterward in its *Proceedings* (1860).[6]

Morgan was a monogenist, like Gray and Darwin; in May 1859 he had presented a paper on Agassiz's polygenetic theory of the origins of humankind, stating his "long cherished belief in the unity and consequent brotherhood of the human races," which he hoped to substantiate through his ethnological research.[7] Yet Morgan did not rush out to buy Darwin's *Origin of Species*. The inventory that he and his wife, Mary Elizabeth Steele Morgan, kept of their library shows that he (or they) bought Huxley's 1863 popularization of Darwin's *Origin* within a month of its publication in the United States, but did not buy Darwin's book until December 1865. In October 1863, Morgan's friend Chester Dewey presented a paper titled "Professor Huxley on Man and the Anthropoid Monkeys" to their men's club. Perhaps Morgan bought Huxley's book anticipating Dewey's talk, but his library list for September–October 1863 shows he had many other interests as well, including Victor Hugo's *Les misérables* (1862), the U.S. Coast Survey for 1861, Catlin's *Letters and Notes on the Manners, Customs, and Conditions of the North American Indians* (reissued in 1857), three books on grieving, two hymnals, and one dictionary of the Bible, just to mention a few.[8]

When the Morgans visited Europe for the first time in 1870–71, Morgan prepared by asking Asa Gray to assist him in meeting with Darwin in England. From a lodging house in Bury Street, St. James, Morgan addressed himself to "The first of living Englishmen Charles Darwin. As your country has given you no title I take the liberty of adding an American designation," enclosing an advance copy of the last chapter of *Systems*.[9] He compared their works: "In a general sense the results of my investigations are in harmony with the Darwinian theory as far as man is concerned [he had undoubtedly heard from Gray that Darwin was working on *Descent of Man*]: and it occurred to me that you might be glad to look over this chapter in advance." By "harmony," Morgan may have alluded to his historical theory of how humans transformed their relationships from "Promiscuous Intercourse" to "The Civilized Family," rather than to his discovery of patterns in their terminologies of relationships, because he added: "It must be the next work of Ethnology to study with more care the ages of barbarism, to fix the great and successive stages of progress through it, and to find the sequence of customs and institutions which created these epochs."[10]

Darwin quickly distinguished his work from Morgan's: "I fully agree with your remarks on the extreme importance of studying the habits & institutions, if they

can be so called, of savages. I have had lately to attend a little to this subject, as I have sent my M.S. to the Printers for a work on the 'Descent of man'; but I have chiefly to treat of veritably primeval times before man was fully man."[11] They met for lunch when Morgan returned to England the following June, Darwin having told Morgan that "my health has been very indifferent during the last week, & I am really incapable of conversing with any one except for a short time."[12] Morgan later wrote in his journal about the "brief two hours or a little less":

> Mr. Darwin referred to my Beaver Book in very cordial terms. He said he thought it had been badly managed as he had found very few persons who had heard of it. I told him 29 copies had supplied the English demand the last I had heard of the sales. He also referred to my work on Consanguinity of which I sent him the last chapter last fall. After commenting upon the originality of the investigation, and the interesting character of the results, he remarked that it would stand to the end of time, although some of the conclusions might be modified. He further said he had read every word of it, but found it difficult to follow the relationships. That Sir John Lubbock proposed to give a lecture upon the subject last winter and asked his advice, whereupon he cautioned him against it for the reason that his audience would not be able to follow him. I told him it argued unfavorably for the reception of the work if it was to be understood with so much difficulty, but that I thought with the diagrams and tables which he had not seen, and with the general explanations there would be no difficulty.

Morgan concluded: "He kept the conversation more upon my own subjects than upon his own which was fortunate for me as I should soon have been stranded in the discussion of his great themes."[13]

The difficulties were clearly mutual. Darwin's copy of Morgan's *American Beaver* shows marks or notes on roughly 50 of its 284 pages (not including the appendixes), but his copy of *Systems*, inscribed with Morgan's signature, is unmarked and many of its pages uncut.[14] Nor did Darwin cite *Systems*. He cited instead Morgan's 1868 paper on classificatory systems of relationship as an adjunct to comments on work by Tylor, M'Lennan, and Lubbock supporting his claim that "all civilized nations are the descendants of barbarians"; with M'Lennan and Lubbock in claiming that "all forms of marriage during primeval times were essentially unknown"; and with Lubbock, and against M'Lennan, that polyandry was also unknown then.[15]

Yet Darwin did cite Morgan's "excellent account" in *The American Beaver and His Works* to argue with Pouchet, and against Cuvier, that "complex instincts" and "a high degree of intelligence" may coexist. He observed in a footnote that Morgan "goes too far in underrating the power of Instinct" and made no mention of Morgan's repeated claim that instinct has no analytical value.[16] Except for this point, their views seem quite similar. Darwin summarized his survey of animal behavior by saying: "man and the higher animals, especially the Primates, have some few instincts in common. All have the same senses, intuitions and sensations—similar

passions, affections, and emotions, even the more complex ones; they feel wonder and curiosity; they possess the same faculties of imitation, attention, memory, imagination, and reason, though in very different degrees." Therefore, he did not agree with those who claimed that "man is separated through his mental faculties by an impassable barrier from all the lower animals." On the contrary, his purpose in *Descent of Man* is to argue, based on the capacity of all animals for "progressive improvement" in mental and physiological qualities alike, that human intelligence evolved out of instinct.[17]

Perhaps Darwin recommended Morgan's *American Beaver* to the young physiologist George John Romanes, with whom he started corresponding in the summer of 1874. Yet in Romanes, Morgan's work met a dead end. Romanes devoted almost an entire chapter of *Animal Intelligence* (1882) to an excited account of Morgan's beaver research, only to reverse his position in *Mental Evolution in Animals* (1883). "Private sources," whom he described as "correspondents [who have] undoubtedly seen much of the habits of American beavers," informed him that "the intelligence of the beaver has been greatly over-estimated." He therefore felt it "most judicious . . . pending further and trustworthy observations" to say nothing more about the beavers' "quality of reason" and would never have mentioned Morgan's work again had he not promised to do so in *Animal Intelligence*; "I prefer, with this explanation, to allow the matter [to] drop," he wrote.[18]

Ironically, Darwin's "Posthumous Essay on Instinct," which Romanes included in *Mental Evolution*, does not represent Darwin's views any better, at least not those Romanes would have known from Darwin's *Descent of Man* or *The Formation of Vegetable Mould through the Action of Worms* (1881), an analysis of worms' behavior published just months before Darwin died.[19] The essay Darwin gave to Romanes came from the "big book" he was writing in 1855–57, when Wallace's discoveries prompted him to publish his summary *On the Origin of Species* in 1859. The arguments are substantially the same as those in *Origin*'s chapter 7, "Instinct," where Darwin wrote that the behavior of all animals other than humans is governed by instinct, rote behavior unmediated by thought. The conclusion is almost identical: "It may not be logical, but to my imagination, it is far more satisfactory to look at the young cuckoo ejecting its foster-brothers, ants making slaves, the larvae of the Ichneumidæ feeding within the live bodies of their prey, cats playing with mice, otters and cormorants with living fish, not as instincts specially given by the Creator, but as very small parts of one general law leading to the advancement of all organic bodies—Multiply, Vary, let the strongest Live and the weakest Die."[20]

Morgan's name dropped out of the history of animal psychology. By contrast, William James drew on Darwin's discussion of instinct in *Origin of Species* and on Romanes's *Mental Evolution in Animals*, including Darwin's posthumous essay on instinct, in developing the functionalist theory of instinct he published in *Scribner's Magazine* in 1887. He argued for a "strict physiological" approach,

interpreting instincts as "reflex actions" that form the unthinking "habits" dominating the "psychical economy" of human beings after the age of twenty-five: "To detect the moment of the instinctive readiness for the subject is, then, the first duty of every educator." These ideas, developed in *The Principles of Psychology* (1890) while he was an educator at Harvard, have since been taken up in evolutionary psychology.[21]

Darwin and Morgan were not of one mind when they met in 1871. Yet they seem to have shared far more ideas about the substantial overlap in the capacities of humans and other animals to feel, remember, reason, and improve in these capacities than the divergent histories of their work after their deaths in 1881 and 1882 would suggest. The conceptual center of gravity for Darwin's work was clearly his theory of descent with modification through natural selection. Morgan too was preoccupied with how animals changed over time, especially how, after learning from experience, they changed as social collectivities. The American context of Morgan's life and research helps to clarify just why he adopted his distinctive approach to their common concern with what was in its vernacular form, in both Great Britain and the United States, "progressive improvement."

IMPROVING THE MIND IN CENTRAL NEW YORK STATE

Morgan was twenty-five years old in 1843 when he published his first essay, "Mind or Instinct: An Inquiry concerning the Manifestation of Mind by the Lower Orders of Animals," arguing against the value of instinct as an analytical category and for the intelligence of all animals, including humans.[22] Darwin was around twenty-nine years old when he wrote the following famous lines in his Notebook B in early 1838, roughly eighteen months after returning from his round-the-world voyage on the H.M.S. *Beagle*:

> Animals—whom we have made our slaves we do not like to consider our equals.—«Do not slave holders wish to make the black man other kind?» Animals with affections, imitation, fear ‹of death›. pain. sorrow for the dead.—respect.
>
> «—the soul by consent of all is superadded, animals not got it, not look forward» if we choose to let conjecture run wild then ‹our› animals our fellow brethren in pain, disease death & suffering «& famine»; our slaves in the most laborious work, our companion in our amusements. they may partake, from our origin in ‹there› one common ancestor we may be all netted together.—
>
> Hermaphrodite animals couple: argument for true molluscs coupling.[23]

In Notebook B, Darwin was inspired by his grandfather Erasmus Darwin's *Zoonomia* (1794) to focus on the transformative potential of sexual reproduction in organic life. His note on "hermaphrodite animals'" coupling is not the sharp

shift from universal brotherhood it might first appear to be. From Notebook B onward, Darwin pursued human-animal relations increasingly through the study of reproduction, expanding his attention to include domestic animals, completely in keeping with the growing agricultural emphasis in Great Britain since the late 1700s on breeding improved animals and plants.[24] His focus on the transformative potential of reproduction was later critical to his arguments in *The Origin of Species* and *The Descent of Man* about how the instincts of animals evolved into the intelligence of humans.

Darwin's contemporaries in the United States were certainly preoccupied with what they too called the improvement of animals and plants.[25] Morgan was born on his family's farm just south of the village of Aurora on the eastern shore of Lake Cayuga in central New York state. Jedediah and Harriet Morgan moved into Aurora four years later, leaving the farm in the hands of Jedediah's eldest son by his first marriage. At his death in 1826 Jedediah's estate included 570 acres of land devoted to the cultivation of cattle, horses, at least twelve hundred Merino sheep, and wheat.[26] Among the early entries in Lewis and Mary Morgan's library list—the books they brought to their marriage—is Robert R. Livingston's famous *Essay on Sheep* (1813), which discusses bringing Merino sheep from abroad to be improved in the United States. Livingston, a fellow New Yorker active in state and federal politics, was explicitly concerned with "such improvements in agriculture as may add to the wealth of individuals, and by forming the basis of manufactures, to the independence of our country."[27]

Morgan kept his father's book, and occasionally he bought works on farming later in life. Yet his earliest papers and publications show him to have concentrated far more on improvement as a sociocultural, historical, and material process in humans: improving the mind through education and especially through speech, its highest expression. Morgan's argument, developed most fully in *Systems* (1871)—that human genealogical relationships are systematically connected, and thus people are one "human family"—was based not on comparative anatomy, but on historical philology: the study of relationship terminologies, the semantic patterns among words like "mother," "father," "sister," "brother," and the like.

Scholars had begun to show that widely varying "Semitic" languages had originated by branching descent from a common source, as had the many languages classified as "Indo-European." The outstanding question was whether these several language families had common historical roots, thus proving the common historical origins of all of humankind. As Trautmann has demonstrated, Morgan's innovation was to show that the linguistic patterns in kinship terminologies are not simply phonological or syntactic. They are semantic, articulating a limited number of patterns in sets of relationship terminologies ranging from what Morgan called "descriptive" to "classificatory," depending on the extent to which their terms distinguished or merged genealogical relations like "mother" and "mother's sister,"

which in Morgan's American practice would have been distinct. Subsequent linguistic and historical evidence has confirmed Morgan's arguments for the existence of such patterns and their persistence over centuries, if not his assumption of a correlation between patterns and social practices.[28] While Morgan eventually drew on works in contemporary historical philology to further his research, I suggest that his sensitivity to language as a crucial instrument for the progressive development of human minds also derived from his experiences of common practices of cultivating the minds of nascent citizens raised on the new America's expanding agricultural frontiers.

Aurora is now remote from the east-west throughways cutting across New York state. But it had been on the Great Western Turnpike from Albany into the interior on which veterans such as Morgan's grandfather in the late 1700s and early 1800s traveled to take up land grants from the federal government in exchange for their military service in the Revolutionary War.[29] These roads became byways after the completion of the Erie Canal in 1825 and the associated branch canals at the northern ends of the lakes in the late 1820s. By then, Aurora had a flourishing coeducational preparatory school, Cayuga Academy, which had opened in 1800, and a "small library," which was noted in Horatio Gates Spafford's *Gazetteer of the State of New York* for 1813. By 1841, the academy enrolled 44 and 208 students in its primary and secondary programs, respectively.[30]

The academy's principal (1829–35) and teacher (to 1850), Salem Town, held the title "Teacher of Philology and Lecturer on Ancient and Modern History and the Origin and Progress of the Arts and Sciences." Town's best-known textbook was *An Analysis of the Derivative Words in the English Language*, published in 1835 and many times thereafter.[31] Town believed his analysis of Greek and Latin derivatives in English applied to the analysis of language generally, and through language to "the very principles by which every scientific man is guided, and on which rests all his critical knowledge in any language."[32]

Morgan was one of Salem Town's students in the 1830s before he moved in 1838–40 to Union College, founded by its president Eliphalet Nott on a dual curriculum: classics and sciences.[33] Morgan's records show he studied algebra, trigonometry, hydrostatics, mechanics, optics, and physiology, but chose classics as his specialty.[34] While studying languages, and language as such (following Salem Town's teachings), he would have read works like Cicero's *De Oratore*, which extols oratory as the highest form of humans' most distinctive attribute, speech.[35] He also took courses in logic and rhetoric, including Nott's famous "Kames," based on Kames's *Elements of Criticism* (1763), in which Nott debated how best to understand "criticism"—humans' unique capacity for reason—in terms of scientific principles and practices.[36]

Judging from the pamphlets Morgan saved in the 1830s, he attended lectures at the Young Men's Association for Mutual Improvement in Albany, where lecturing

exemplified the highest form of improved teaching and learning. For Morgan, raised as a Presbyterian, sermons (many of which he kept) would have been among such potent combinations of form and content, reinforced by a theology of "the Word" as a prime mover, which prevails across Protestant sectarian differences. The papers Morgan saved show that he took many opportunities to give lectures of his own and was proud of them.[37]

Morgan was a founder of clubs for men in which they improved their minds by giving lectures to one another on their scholarly accomplishments. After graduating from Union College in July 1840 and returning to Aurora to study law with a local attorney, David Wright, he re-enrolled at Cayuga Academy in the fall to keep studying classics. He founded the first of his societies, the Gordian Knot, on January 1, 1841.[38] Sometime in the fall of 1843, following his growing interest in Indian settlements that long preceded the founding of Corinth, Rome, Troy, and Syracuse, New York, Morgan urged his fellow members to reorganize the Gordian Knot into the Grand Order of the Iroquois. He served as the first head of its council in 1844–46, and he established a chapter of the club in Rochester when he moved there to practice law in late 1844, while still attending the meetings in Aurora. Ten years later, he and his friend Chester Dewey formed the Club, an improvement society based on their scholarship in, or alongside, their professions. They held its first meeting, and the first of every year thereafter, at Morgan's house. Morgan also tried to organize a Rochester Academy of Science.[39]

The intense focus on English and its ties to Greek and Latin through the classics must be seen in relation to the persisting multilingualism of the regions in which Morgan was raised and schooled. Schenectady, where Union College is located, still had enough Dutch and Iroquois-Dutch-speakers that Jonathan Pearson, one of his teachers, could document their modes of speech.[40] The Iroquois in New York state still spoke Seneca, Mohawk, Onondaga, and other Iroquois languages among themselves. The multilingual Ely S. Parker from the Seneca reservation at Tonawanda near Buffalo, whom Morgan met in an Albany bookstore in the spring of 1844, inspired Morgan to transform the Grand Order of the Iroquois into a society dedicated to firsthand ethnological research, in part because Parker could serve as a "Translator and Reporter" for other Iroquois-speakers as well as speak for himself.[41] The Algonquian-speakers with whom Morgan worked in northern Michigan were typically conversant in other Native American languages as well as French and English. Had Morgan not known before, he would have quickly learned through Ely S. Parker that Iroquois leaders also valued their command of public speaking, especially what Parker translated as "Teachings."

In 1843 and 1844, when Morgan was still in Aurora, he turned to publishing his lectures. In three of his first four, all published in the *Knickerbocker*, edited by Lewis Gaylord Clark from neighboring Onondaga County, he covered predictable subjects given his interests at the time.[42] "Aristomenes the Messenian," a

little-known Greek military hero, shows that the "finest traits of mind" are not always displayed on "the most conspicuous stage." "Thoughts at Niagara" compares the Canadian and American waters to the pasts and futures of Great Britain and the United States; each is mighty but the younger will triumph. "Kar-is-ta-gi-a, a Sachem of Cayuga" recounts the sachem's vision of his people's replacement by the likes of the Grand Order of the Iroquois, to which Morgan first gave the paper as a lecture.

Thus Morgan's "Mind or Instinct: An Inquiry concerning the Manifestation of Mind by the Lower Orders of Animals" comes as a surprise. If Aristomenes was an inconspicuous herald of mind's best traits, surely the "orders below Man" were invisible. Yet "the cultivation of the intellectual endowments" is precisely his topic, and he argues for animals' minds like a seasoned logician, joining classical writers like Cicero, Pliny, and Aesop (quoted in the original Greek and Latin) to famous naturalists like Cuvier and Buffon and famous theologians like Paley.

His premise is that we know nothing of the "ultimate nature" of either "instinct" or "mind" and must therefore infer their nature from the sensory organs through which animals and humans perceive the world and their resultant actions. It is illogical to assume that animals "toil in blind experiment," as he writes of a fox making his burrow in a dry and secluded place. When animals do as humans would have done, given the comparable physiology of their senses and brains, the only rational conclusion is that animals remember, imagine, communicate, plan, divide their labors, learn, contrive, construct, "shov[e] with their shoulders" (as he says of ants, quoting Pliny), reason, and deceive like humans. Animals' supposedly distinctive "instinct" works like humans' "mind." Therefore, instinct is illusory, and the intelligence of animals and humans requires a common analytical framework. "There is nothing unnatural in this theory; so far from it, it appears to be suggested by nature itself." The problem is that "we know nothing concerning their secret relations," and our ignorance is compounded by our cruel indifference.[43]

Why animals? By 1843, Morgan could have read *Algic Researches* (1839) by Henry Schoolcraft, the famous ethnologist of Indian life in the Great Lakes region, in which Schoolcraft notes that "these tribes believe that animals of the lowest, as well as the highest class in the chain of creation, are alike endowed with reasoning powers and faculties."[44] But there is no evidence that he did. His explicit inspiration is William Cowper's verse in praise of animals from "The Task" (book 6), which is cited as the epigraph to both parts of "Mind or Instinct" and further within: "In some are found / Such teachable and apprehensive parts, / That man's attainments in his own concerns, / Matched with th'expertness of the brutes in theirs, / Are oftimes vanquished and thrown far behind." *The Works of Cowper and Thomson*, published in 1841, in which these lines appear, was among the books that Lewis and Mary Morgan brought to their marriage in 1851.[45]

Thus Anglo-Americans like Morgan seem to have been as powerfully influenced by Cowper's consideration of the relations between humans and animals as were their British contemporaries who were reading the "Romantic" poets (so-called from the 1820s on).[46] Darwin wrote later in his autobiography that Wordsworth and Coleridge were his favorite poets after Milton.[47] Looking back to his entry in Notebook B comparing the enslavement of animals and humans, we might wonder whether he had been reading Coleridge's "To a Young Ass" (1794), in which the poet makes that comparison.[48] Why did Darwin and Morgan go further than these observations? In Morgan's case, I will argue that his unexpected encounter with the entwined labors of humans and beavers in northern Michigan provoked him to examine their "secret relations" through firsthand research.

LEARNING THROUGH LAND IN NORTHERN MICHIGAN: SPEAKERS AND MUTES

When *League of the Ho-dé-no-sau-nee, or Iroquois* was published in Rochester in 1851, Morgan gave his new wife, Mary, a copy with colored plates, gilt-edged pages, and black enameled metal covers, an Indian scene framed in mother-of-pearl and gold set in the front, and his photograph set inside.[49] Rochester was becoming "the east" to an expanding western frontier, and Morgan seems to have considered his Iroquois work settled. Morgan and Chester Dewey, a professor of chemistry and natural science at the University of Rochester, organized the Club in the fall of 1854, following Louis Agassiz's lectures at the Rochester Athenaeum and Mechanics' Association the previous spring. Agassiz might have offered the lecture "On the Natural Provinces of the Animal World, and Their Relation to the Different Types of Man," his contribution to Nott and Gliddon's *Types of Mankind*, published that year.[50] Chester Dewey's lecture to the Club in 1854, "The Difficulty of Locating Man in the Present Zoological System," was the first of five critiques of Agassiz's polygenism he presented to the Club over the next four years. Morgan's lecture in 1854 was "The Andes." His critique of Agassiz's "theory of the diverse origin of the human race" came later in his paper to the Club in May 1859, four years into his new research.[51]

Morgan resumed his work with both humans and animals in July 1855 when the consequences of the west-moving frontier for grain markets at home drew him to the forests of northern Michigan to litigate over land rights for the Ely family, grain millers from Rochester who had turned to iron mining and railroad building. His destination, three days by steamer from Rochester, was the tiny port of Marquette, founded in 1849 on the south shore of Lake Superior to ship ore from the mines in the Iron Mountain roughly seventeen miles to the southwest. Samuel Ely kept his family's house in Marquette, where Morgan stayed every summer he was in northern Michigan for the next ten years.

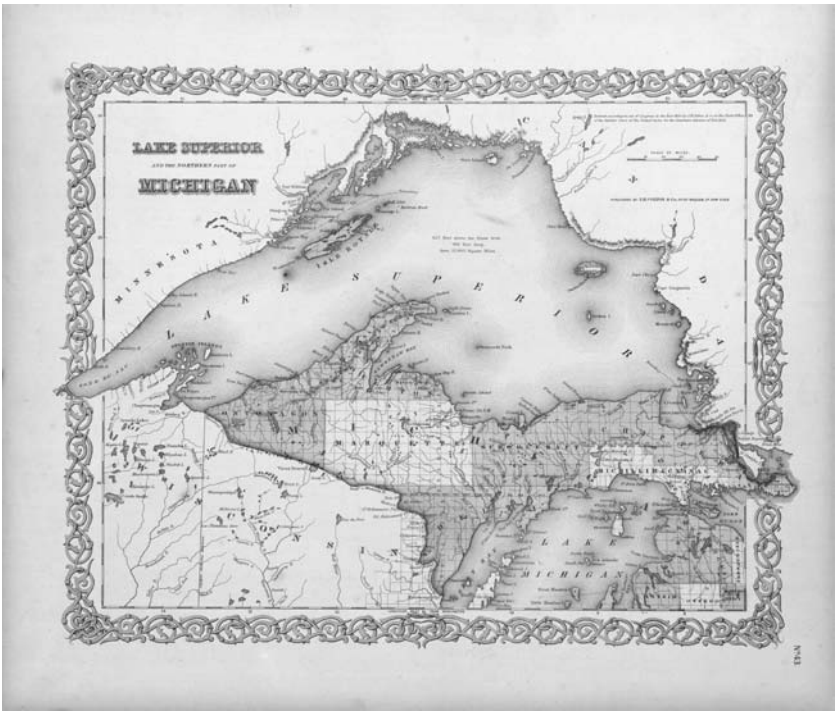

Figure 5. J. H. Colton, "Lake Superior and the Northern Part of Michigan" (1855), showing the surveyors' division into townships six miles square. Courtesy of the Bentley Historical Library, University of Michigan.

They traveled out to the mines on the Ely brothers' train. The surveyors who started mapping these townships in 1843—the year of the proclamation of the Treaty of La Pointe (1842), in which the Ojibwas ceded to the U.S. government the last of their land in Michigan—found the forest in this area southwest of Marquette so dense and swampy that they could not use packhorses; they hired Ojibwas as packmen.[52] To Morgan a decade later, it was

> uninhabited even by the Indian; and until within a few years, untraversed except by the hunter, the surveyor, and the trapper. The works of the Beaver are now abundant and for the most part undisturbed on the streams between Lake Superior and Lake Michigan; and that which is more to the purpose are in actual use at the present moment. A more favorable locality therefore could hardly be found for the examination of their erections, for it presents not only the dam, with its pond, and lodge upon its border, its burrows in the banks, its beaver canals, and fallen trees; but a series of these dams with their appurtenances, so located with reference to each other as not to interfere, and yet to use every portion of the stream for the purpose of habitation.[53]

Morgan's first trip to Marquette in July–August 1855 was taken up with tours of the region's already famous copper and iron mines and the litigation over land that had brought him there. He did not return to Marquette until three years later in July 1858. But he would have seen the beavers' works from the train, if only their meadows, and he might have met William Cameron, whom he credits in *The American Beaver* with first acquainting him with "the beaver lore of the trappers." He describes Cameron—a "quarter-blood Ojibwa, and the son of one of the factors of the Hudson's Bay Company [who] married an Ojibwa woman [and] adopted the customs of her nation"—as a widely traveled voyageur and trapper in the Lake Superior region.[54] However, Cameron also worked as a guide and surveyor for the new mining and railroad companies, including the Iron Mountain Railroad (later Bay de Noquet and Marquette Railroad), which the Ely brothers started in 1851, and their Lake Superior Iron Company, incorporated in 1853.[55]

Traveling west reoriented Morgan eastward as well. After returning to Rochester, he joined the American Association for the Advancement of Science (AAAS) in August 1856 at its tenth annual meeting, held in Albany. There he may have met Louis Agassiz, Joseph Henry, Benjamin Peirce, James Dwight Dana, Jeffries Wyman, James Hall, S. F. Baird, David F. Weinland, E. N. Horsford, Daniel Wilson, and Ebenezer Emmons, all of whom gave papers that year, and probably Asa Gray who, like Agassiz, had been an AAAS member since its founding in 1848.[56] By October 2, 1856, Morgan had started a file called "Newspaper Articles & Anecdotes of Animals," the earliest of which, "Musical Practice among Birds," appeared in Rochester's *Daily American* on that date and the last in 1872.[57] In April 1857 his lecture to the Club was "Animal Psychology."[58] And in August 1857, he presented a paper at the AAAS called "Laws of Descent of the Iroquois." Perhaps he did not see his research on humans and beavers as related. Yet he was already working on them alternately. Soon both were grounded in his work in northern Michigan, and in both he began to develop a historical and generational analysis.

In 1856 the papers at the AAAS included two in philology and ethnology (one on runes, the other on the possibility of Chinese-Indo-European relations based on sound similarities) and two in zoology by David Friedrich Weinland, a German visitor to Harvard (one on the digestive physiology of worms and another that might have caught Morgan's attention: "On the Names of Animals and Plants, with Reference to the Origin of Languages, and to the Countries Where Nations Passed Their Childhood"). Weinland argued that root words for plants and animals are those native to wherever the speakers and their language originated, in contrast to compound or borrowed words naming animals foreign to the place or encountered later: "Thus zoölogy and botany and philology combined, may help ethnography in determining the cradles of the nations of the earth," the cradles of their childhood when they learned to speak, that is, not the birthplaces of their infancy.[59]

Morgan's "Laws of Descent of the Iroquois," presented at the AAAS a year later in August 1857, makes a similar argument about the semantics of matrilineal descent among the Iroquois, which he hoped to generalize to Indians throughout North America, ultimately proving their migration from Asia. Yet this paper also marks the expansion of his interests from the language of descent to what he considered historically deeper patterns embedded in actual practices of kinship and affinity. The "domestic institutions" were the "primary institutions of a people," and therefore more stable historical markers, because they were the means by which a people reproduced itself in the fullest sense, not simply their individual lives, but a way of life. "It is only by the entire and absolute transmutation of a race from the hunter to the civilized condition [which he identified with agriculture], that such institutions can be eradicated. . . . Not even language itself will be found to be more stable than the domestic institutions."[60]

If Morgan did attend Weinland's presentations at his first AAAS meetings in August 1856, could Weinland have told Morgan that he was about to give a paper called "A Psychological View of the Motions of Animals" to the Boston Society of Natural History in six weeks? Weinland proposed his theory of "animal psychology" to address the "so little studied" subject of their "mental constitution (ψύχή)." His specification of the Greek *psyche* is striking because it can mean "soul" in English or in German, as in Peter Scheitlin's *Versuch einer vollständigen Thierseelenkunde* (1840), a singular German predecessor he surely knew. Weinland (like Morgan had earlier) argued that psyches can only be inferred from actions. Animals' actions are either subjective and self-oriented, or sympathetic and other-oriented. The highest form of intelligence is social, the capacity to discern and respond to the sympathetic motions of others. Animals can thus be ranked from the "hermaphrodite worm" to the human, whose "free, flexible language" represents "the highest kind of sympathetic motions."[61]

"Animal Psychology," Morgan's next paper to the Club, presented on April 7, 1857, never mentions Weinland's work, perhaps because the title phrase (if that) was all they had in common. Surprisingly, given Weinland's still unusual emphasis on social intelligence and Morgan's deepening interests in social institutions, Morgan's argument was hardly changed from "Mind or Instinct" (1843). Humans and other animals share the sensory structures and thus capacities for perceiving, remembering, reflecting, communicating, willing, and reasoning. In comparison to Weinland's views, Morgan's are asocial. Nor do the beavers figure into his examples, except one mention in a string ranging from elephants to oysters. The distinctive feature of Morgan's new work is that the former "animals" other than humans have become "the Mutae." Perhaps he meant to amuse his friends who knew of his abiding interest in the ancients.[62]

In this paper, as in "Laws of Descent of the Iroquois," he expands his understanding of how patterns of thought may be articulated, communicated, and

conveyed across space and time in forms other than human speech, perhaps growing and changing in the process. He now argues that "thought is anterior to all language, and not necessarily dependent upon it." Man is not the sole "progressive animal" in the world among "stationary" mutae; the mutae also progress across generations and ages. While humans alone progress through written language, even domestic animals exemplify "the improvability of several species from generation to generation." Growth through experience can be passed on by teaching offspring. The moral to be drawn from this argument is that every species has God-given rights, "which no other may violate and escape the consequences."[63]

Thus when Morgan returned to northern Michigan in early July 1858, he might have anticipated more insights into Indian descent systems or into animal psychology or both. Within a week he was back at William Cameron's house in Marquette. Cameron was "absent fishing. A Scotsman and disowned by his family," Morgan wrote in his journal. "The following vocabulary was taken . . . through William Cameron Jr. from his mother a Chippewa woman *and an old Chippewan*" (the emphasized words are inserted above the line in the journal).[64] The list began with "God, Devil, Man, Woman, Boy, Girl, Infant." It continued over several pages with "names of relationships," as Morgan called them: "Father, Mother, Husband, Wife, Son, Daughter, Brother, Sister," followed by "An Indian," then parts of the head and face, the house, the sky, seasons, weather, landscape, trees, plants, and animals (beginning with "Beaver"), colors, attributes of people like age, pronouns, numbers, and certain verbs.

When the elder Cameron returned, Morgan went "over again the whole subject of their law of descent." Although the languages of the Algonquian-speaking Ojibwas and the Iroquois-speaking Senecas differed, he found that the Ojibwas' "law of descent . . . is the same essentially as that of the Iroquois." Morgan confirmed this by returning to the Senecas at Tonawanda in November. Based on these data he wrote a circular letter in January 1859 requesting information on "systems of consanguinity among tribes of North American Indians."[65] Thus, in May 1859, when Morgan presented a paper to his Club criticizing Agassiz's polygenetic view of the "diverse origin of the human race," he was taking his first steps in arguing that the divergent branches of the human family had a common origin from which they had migrated to encompass the world. He followed up with a paper titled "System of Consanguinity of the Red Race, in Its Relations to Ethnology," which was presented at the AAAS meetings in August 1859. Shortly afterward, he got a response to his circular from the missionary Dr. Henry W. Scudder on the relationship terms of Tamil- and Telegu-speakers in southern India, suggesting that his hypothesis of the Asian origin of the American Indians might be confirmed. He then composed a new circular, dated October 1, 1859, asking for data on "systems of consanguinity among peoples of Asia, Africa, Islands of the Pacific, Mexico and South America," which Trautmann considers his *Systems* in embryo.[66]

BEAVERS' WORKS AND ENVIRONMENTAL TRANSMUTATION

The American Beaver in embryo took shape in northern Michigan in August–September 1860 and would be presented to the Club on October 16 as a paper called "Beaver Dams and Lodges." Within a week of arriving in Marquette, Morgan and the Ely brothers took the train to the Iron Mountain district to fish on the Escanaba River, where Mr. Johnson, the superintendent of their Lake Superior Mine (Morgan was now a co-owner), had made a little camp for the purpose. Accompanied by "a Frenchman" as packman and cook,[67] they followed a surveyor's line three and a half miles east into the forest from the railroad track to the river. Fishing in one mile of the Escanaba for a day and a half, they caught "270 trout . . . of various sizes from three or four ounces to three fourths of a pound."[68] Here, deep in the woods, Morgan saw before him the legendary creations of the beaver long gone from the east, and he tried to map them as a whole.

Morgan's sketch illustrates what then and after so amazed him about the beavers' works: they extended far beyond what rodents whom he considered basically burrowers, nocturnal at that, would need to survive. In addition to the burrow, there was a whole array of "artificial erections," as he called them in his notes: dam, pond, lodge, food cache, channels, and meadows. To imagine Morgan's amazement from a Darwinian perspective, consider what Darwin had written in a letter to Asa Gray the preceding April thanking him for his first review of *Origin*: "The sight of a feather in a peacock's tail, whenever I gaze at it, makes me sick!"[69] How could such extravagant beauty, seemingly without benefit to survival, and possibly even a liability, have come about through natural selection? This was the problem Darwin eventually solved through his theory of sexual selection, developed in the second volume of *Descent of Man*.

The showiness of the beavers' works was amplified by the enormous amounts of time and labor required to create and maintain them, as Morgan quickly learned. The beavers' elaborations of their creations testified that they lived not merely to survive but to flourish: "It is true that the Beaver can, and often does content himself with burrows in the banks of rivers, thus realizing all the ends of existence personal to himself. . . . but at the same time he is enabled greatly to increase his security and to multiply his enjoyments by the construction of a dam, and the erection of a lodge or hut upon the border of the pond. The simple fact that he advances a single step beyond the requirements of necessity is itself significant of a high degree of animal intelligence."[70]

The dam is most important because it is the most extensive and requires constant nightly upkeep and because the floor of the lodge, its entrances, and the entrances of the burrows must all be adjusted to the level of the water ponded behind it. Morgan wrote in his journal about Dam 1: "The dimensions of this structure are almost incredible. It is made of sticks and limbs of trees of various

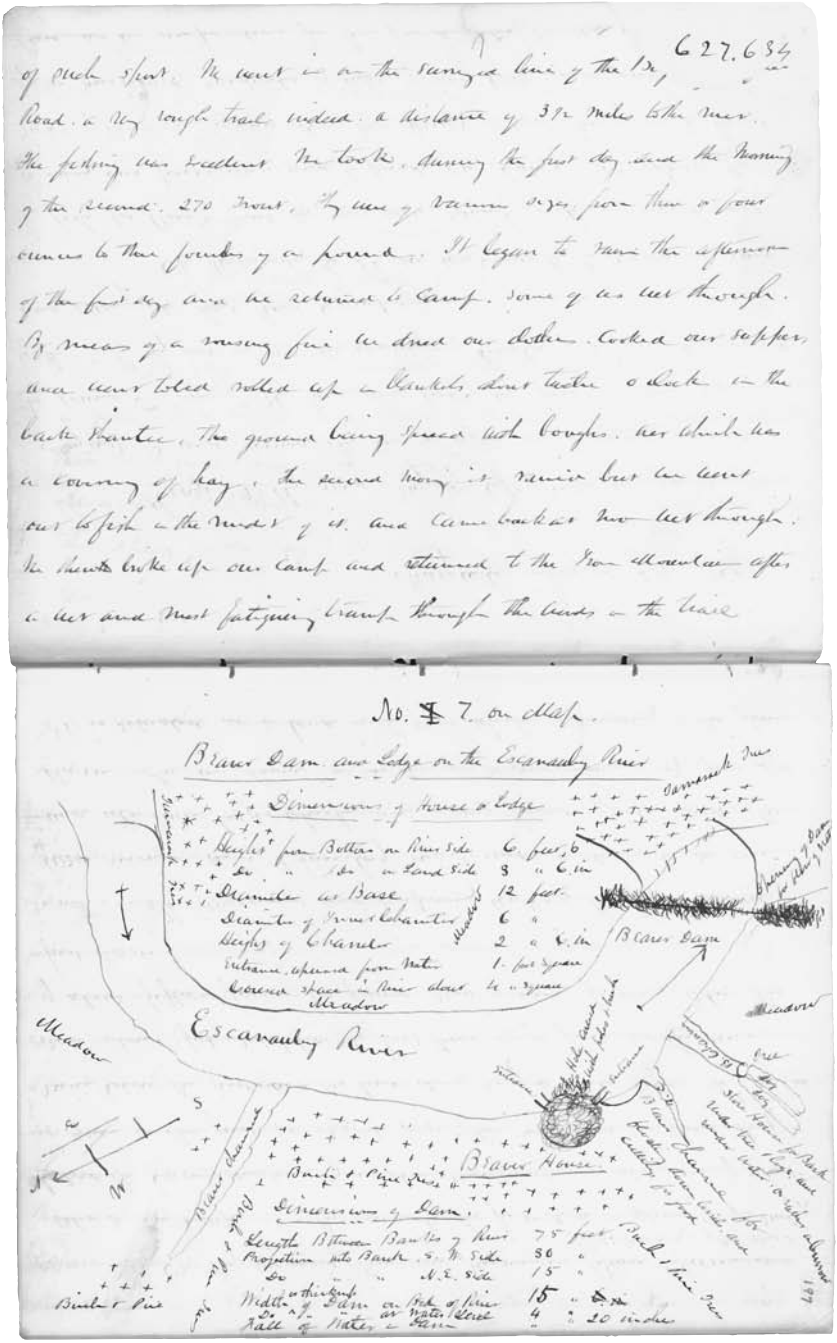
No. ± 7. on Map.
Beaver Dam and Lodge on the Escanauby River
Dimensions of House & Lodge
Height from Bottom on River Side 6 feet 6 "
do " do on Land Side 8 " 6 in
Diameter at Base 12 feet
Diameter of Inner Chamber 6 "
Height of Chamber 2 " 6 in
Entrance above from Water 1 foot square
Entrance Hole in River about 12 " square
Meadow
Escanauby River
Beaver House
Dimensions of Dam
Length Between Banks of River 75 feet
Projection into Bank S. W. Side 80 "
do " N. E. Side 15 "
Width of Dam at Top of River 15 " 0 in
Height of Water at Water Street 4 " 20 inches

Figure 6. "No. ± 7. on Map. Beaver Dam and Lodge on the Escanauby River," August 1860. From Lewis Henry Morgan Papers, Journal 4.2:196–97. Courtesy of the Rush Rhees Library, Rare Books and Special Collections, University of Rochester.

sizes from 1/2 to 2 & 3 inches in diameter and from five to twenty[?] feet in length filled in with mud and earth so as to make a solid bank on which a beaver and a man may walk: and but for the open work at the opening at which the water was discharged a horse and wagon might be driven across the river upon the top level of the dam." "Near[by] is a canal about six feet long . . . which our Frenchman said was a Beaver canal. I doubted him as it had the appearance of a tributary. But he insisted upon it, and it may be true." The "Frenchman" began to tell him about "a fine specimen" of beaver wood, and at this point Morgan inserted the man's name: William Badger.[71]

Together with "William Cameron, William Bass, Paul Pine, and Jack La Pete, Ojibwa trappers," whom he thanked in *The American Beaver* for their "beaver lore," he thanked Badger especially for his "friendly and faithful services. . . . [He] spent many nights with me encamped by beaver dams, and . . . as camp master and explorer, possesses high qualifications."[72] From Morgan's circumstantial accounts in *The American Beaver*, it is clear that these men showed him where in the dense forests he could find the beavers' works, which among them were especially outstanding, how they might be examined inside as well as outside, and whether the "extravagant statements" about "this long-observed rodent" in the works of Buffon and other naturalists could be confirmed or not. Introducing his discussion of beaver lodges and burrows, he noted: "The Indian is a close, and, in the main, an accurate observer of the habits of animals. Without hesitation he places the beaver in the highest rank among them for intelligence and sagacity."[73]

The beavers' dam creates a pond that floods the bank, drowning the trees. They build the canals to reach the wood at the receding periphery of the forest, as the flooded regions gradually turn to meadows. "In this way the natural meadows along the Esconauby [*sic*] and Carp rivers have arisen. The miners now mow these meadows annually. They are really rough clumps of a waist tall grass which they say makes an excellent hay [for their horses]." He later found that the beavers used the grass for bedding and ate the bulbous roots.[74]

Morgan soon found more dams on the Escanaba: two more below Dam 1 in the mile-long stretch where they had fished, which ended in a fifteen-foot falls, and six more above it in a five-mile stretch culminating in an enormous dam 260 feet long, which had created an eighty-acre pond locally known as Grass Lake. At this point he mapped the beavers' works onto the township map together with the miners' works, the railroad, and their campsite. The beavers' works were created by families of beavers over generations: "Have just seen my old friend Cameron again and have had a Beaver talk with him and Rosean [John Roussain]. Cameron is an old trapper. He says the Beaver always marry or live in pairs and never in companies made of different pairs. The first year they build a Lodge or Wigwam [*wig-e-wam*] and a Dam and raise two young beavers. The second year they raise

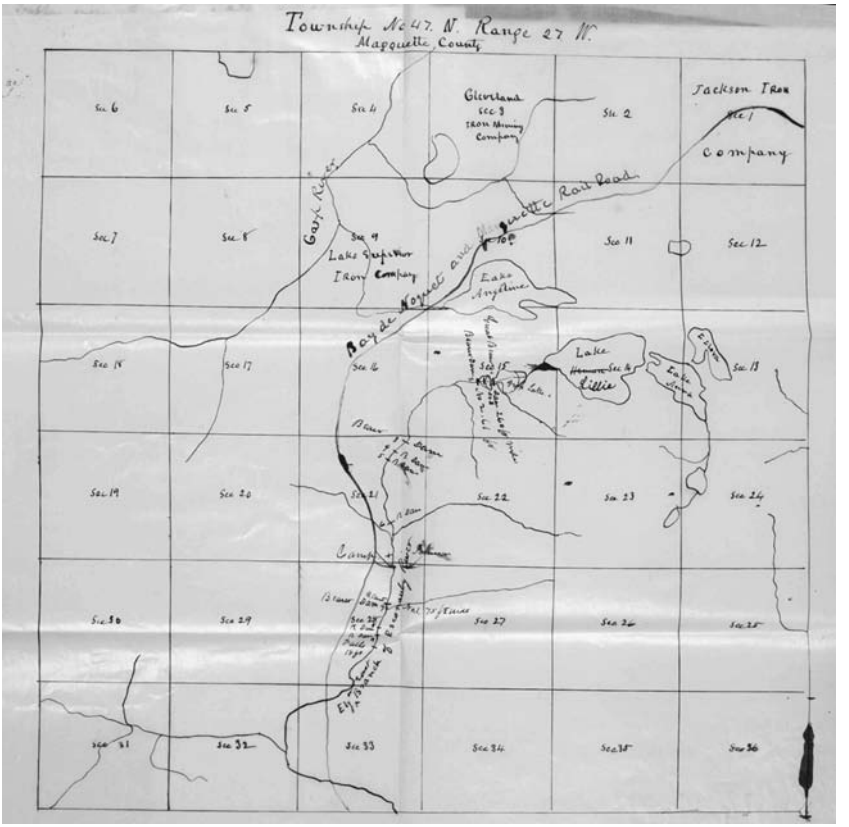

Figure 7. "Township No 47. N. Range 27. W. Marquette County," August 1860. From Lewis Henry Morgan Papers, Journal 4, insert between pages 246 and 247. Surveyors subdivided each township, six miles square, into "sections" a mile square. Dam "No. 1" became "No. 7" on this map, so Morgan changed the number from 1 to 7 in his notes as well (see figure 6). Courtesy of the Rush Rhees Library, Rare Books and Special Collections, University of Rochester.

four. . . . After they have located, the old pair go down and assist them in making a dam, and thus a new family is commenced."[75]

All of the beavers' works were related, each one affecting the structures of all the others in an expanding system:

> The Chippeways assert that the East and West Branch of the Ish-ko-nau'ba [Esconaba], and the numerous rivlets which fall into them, are wholly and exclusively the work of the Beaver. That they opened channels through the low grounds from marsh to marsh, and from pond to pond, as their increasing wants demanded additional accommodations, until they had penetrated every district in which water could be made to flow thereby creating a channel, which, in course of time, was enlarged by the flow of the stream to its present dimensions. Be the truth of this as it may, the name of the river as bestowed by them is founded upon this idea. "Many Remnants of Water" representing the etymological signification of the word Ish-ko-nau'ba.

These structures show that "these dams have existed in the same places for hundreds of years, and have been continued by a system of continuous repairs."[76]

Ecologists of river systems in North America have since confirmed exactly that. Some 60–400 million beavers once occupied almost all of North America from the Arctic Circle to the Mexican deserts, coast to coast. Robert Naiman valued Morgan's work because Morgan glimpsed in a six-square-mile township of northern Michigan a centuries-long vision of the geomorphology and hydrology of continental precolonial North America. By 1900 the beavers were almost extinct; today there are an estimated 6–12 million. Naiman, Johnston, and Kelley state: "Originally, we envisioned that beaver build dams on a stream and through time the ponds age, are abandoned, meadows form and mature, and eventually a stream is reformed as a new channel is cut and the riparian vegetation matures. . . . However, we see [instead] a complex pattern that may involve the formation of emergent marshes, bogs and forested wetlands, which appear to persist in a somewhat stable condition for centuries."[77]

Ish-ko-nau'ba exemplifies what ecologists call the "beaver-meadow complex," that is, "wet meadows with multi-thread channels that occur in broad, low-gradient valleys as a result of beaver dams," which are built successively up into the headwaters of streams.[78] Whereas zoologists had thought that beavers have to migrate because they use up the food near their dam, Ives found what Morgan learned from the Ojibwas, that they usually move just a few hundred yards up- or downstream. Where zoologists had implicitly compared the beaver to a miner who hollows out his environment, Ives saw beavers as farmers because they create through their works the marshy sunlit plains in which the saplings of aspen, their favorite food, can regrow from their submerged root system. Contemporary geo-

morphologists and ecologists have confirmed Ives's insights and shown that "[a]reas with ideal habitat can support beaver populations for thousands of years."[79]

The increasingly diversified mosaic of heterogeneous micro-environments the beavers create in expanding their works over their lifetimes and over generations has also been found to promote the growth and diversification of other plants, insects, animals, and fishes, including Salmonidae, like the trout that Morgan found so amazingly abundant in the pond above Dam 1.[80] Areas throughout North America, from now-arid valleys high in the Rockies to former farmlands around Troy and Schenectady, once thought to be the remains of silted-up glacial lakes, are now understood to be the remnants of beaver-meadow complexes created during the millennia of the Holocene period.[81]

For the zoologists who would read *The American Beaver and His Works*, Morgan argued that systems of classification intended to map generative relationships within and between species over time and place should derive not solely from the comparative anatomy of their corpses but from extended firsthand study of "their artificial works . . . their habits, their mode of life, and their mutual relations."[82] Why are these important? From Darwin's perspective, Morgan's beavers showed how animals used their "unlearnt instincts" and such "reason" as they possessed to adapt to their circumstances: "Few persons any longer dispute that animals possess some power of reasoning. Animals may constantly be seen to pause, deliberate, and resolve."[83] Morgan recognized the "special organic adaptations" that enabled beavers to live their aquatic lives. From his perspective, the main question was not how animals adapt to their surroundings, but how they learn over time to grow, expand, and change themselves, their worlds, and the worlds of other organisms in the process. He postulated that "the burrow is the normal residence of the beaver; and that the lodge grew out of it, in the progress of their experience, by natural suggestion." He documented the beavers' works in fine detail, using sketches, maps, measurements, and photographs to approximate the processes of their reasoning through earth, wood, and water. These are now invaluable aids to reconstructing the precolonial environment of North America, as Naiman notes, but Morgan's inquiry into the "secret relations" of their intelligence remains to be carried further.[84]

DARWIN AND MORGAN ON INSTINCT AND INTELLIGENCE

The instinct and intelligence of humans and other animals was debated in Darwin's and Morgan's lifetimes for at least two main reasons. First, instinct and intellect divided the inside and outside of an organism; they distinguished body from mind, physiology from psychology, nature from artifice, innate from experiential. Second, the debate over what counted as intelligence raised the question of consciousness, especially self-consciousness, and thus the questions of how organisms

that were conscious of their behavior might then alter it, and with what consequences. I will take each of these in turn.

Darwin began his chapter "Instinct" in *Origin of Species* by refusing to define the term because, like Morgan, he knew how vague it was, but he counted on his readers to fill in the gap:

> I will not attempt any definition of instinct. It would be easy to show that several distinct mental actions are commonly embraced by this term; but everyone understands what is meant, when it is said that instinct impels the cuckoo to migrate and to lay her eggs in other birds' nests. An action, which we ourselves should require experience to enable us to perform, when performed by an animal, more especially by a very young one, without any experience, and when performed by many individuals in the same way, without their knowing for what purpose it is performed, is usually said to be instinctive.[85]

Darwin's main purpose in the chapter was to argue that "instincts" are as basic to life as "corporeal structures," that they vary like corporeal structures and are therefore as likely to be modified by natural selection if profitable in the circumstances. What began as an analogy became an identity because in *Origin* and in the chapter "Mental Powers and Instincts of Animals" from his "big book" of 1856–57, which he gave to Romanes, he had used "instinct" to mark a categorical distinction between humans and other animals. He explicitly stated in *Origin* that "I have nothing to do with the origin of the primary mental powers."[86] His purpose in *Descent of Man* is to argue for the gradual evolution of intelligence out of instinct through natural selection, owing to the adaptive value of sagacity.

Morgan, as we have seen, advocated getting rid of the term "instinct" altogether. Beyond its vagueness, he suspected that its main purpose was rhetorical: to maintain a preexisting distinction based in theology, not science, between humans (with souls), whose actions were based in thought, and animals (without souls), whose actions were based in physiological reflexes unmediated by thought. His view was also in keeping with his assertion in *The American Beaver* that the classification of animals should not be restricted to the comparative anatomy of their dead bodies, but should expand to encompass their ways of living, including their relationships and their works, where these existed—exactly the kinds of phenomena he was examining in human beings. In his beaver work, he used the anatomical research of zoologists and his friend Dr. William W. Ely, the medical doctor who did some dissections for him, together with his own ethnographic research, combining inquiries with humans about their encounters with beavers with his observations, measurements, diagrams, photographs, and maps of beavers' works, and what little he could glean from their sounds since, despite many nighttime vigils, he never managed to see one live beaver except in the London Zoo.

How then are we to integrate the disparate testimonies of bodies, words, and works? How are we to join our understanding of the descent of organisms in Darwin's sense, the generation with modification of their lives over time, together with the descent of their "systems of consanguinity and affinity," to use Morgan's title, that is, the historical generation of their ways of living? Morgan derived his title from his conviction, stated in the preface to *Systems*: "In the systems of relationship of the great families of mankind some of the oldest memorials of human thought and experience are deposited and preserved. They have been handed down as transmitted systems, through the channels of the blood, from the earliest ages of man's existence upon the earth; but revealing certain definite and progressive changes with the growth of man's experience in the ages of man's barbarism."[87] Summarizing his stages of human history in *Ancient Society*, he stated further: "A system of consanguinity is not an arbitrary enactment, but a natural growth. It expresses . . . the actual facts of consanguinity as they appeared to the common mind when the system was formed." Yet the "facts of consanguinity" were constantly changing, as he documented in his own terms.[88]

How then are we to understand the historicity of blood? And the blood ties that Morgan from his American perspective took to constitute the unity of the human family—their historical mediation in sociocultural and perhaps even material terms? Given Morgan's emphasis on kinship and marriage as primary to life and ways of living, it is striking that he never did adopt Darwin's focus on reproduction and sexual selection as the ultimate test of fitness to live. Darwin tracked inward to a reproductive physiology he envisioned in *The Variation of Animals and Plants under Domestication* (1868) as encompassing the whole body of an organism, "a microcosm . . . formed of a host of self-propagating organisms," which he compared to "a bed of mould full of seeds."[89] Had Morgan ever developed a corporeally based theory of the generational growth of human beings through "experience," food rather than sex was more likely to have been its foundation. In *Ancient Society* he made the "arts of subsistence" foundational to the advancement of human life.[90] In his last book, *Houses and House-Life of the American Aborigines* (1881), published the year before he died, he combined kinship, marriage, and subsistence in a focus on "hospitality" as a "plan of life."[91] Where Darwin moved inward into a land-like body, Morgan tracked organisms outward as they extended themselves into the earth, air, and water around them: a plan of life from the hearth to the house into an architectural system fully comparable in retrospect to the dams, ponds, lodges, channels, and burrows of the beavers.

The beaver living in burrows "voluntarily transferred himself, by means of dams and ponds of his own construction, from a natural to an artificial mode of life."[92] Human beings, prompted by their social experiences of sexuality and childbirth, created first naturalistic terminologies of relationships, which they gradually transformed into more elaborate and eventually "artificial" forms: deceptively old, but

new, "consanguinities," for example. Prompted by their experiences of eating and feeding themselves and each other, humans developed hearths, shelters, and eventually houses, house life, and hospitality, a universal emblem of human sociality worldwide, mediating between ways of living and their places in the land, articulate signs of learning and intelligence that constituted the means of their further growth and change. What then of their consciousness of these transformational webs of being and becoming?

Both Darwin and Morgan understood intelligence as adaptive for all creatures and as the very basis of the dominance of humans at the top of the scale of nature. Intelligence contributes to the capacity of all organisms to adapt to circumstances in their lifetimes and over generations, and to the capacity of humans specifically for progress and ultimately civilization, the mark of their dominance. Intelligence is exemplified not in the wiliness of the rabbit who knows how to hide, but rather in the wiliness of the predator who knows that the rabbit will hide and where to find it. Morgan himself attributed the greatest intelligence to carnivores on exactly those grounds.[93] Both Darwin and Morgan accepted competitive predator-prey relations as basic to all organic life. Asa Gray's first review of *Origin* back in March 1860 identified the defining feature of Darwin's theory of natural selection as "conflict in nature among races in the struggle for life [in which] the weaker ones be destroyed in the process, and the strongest in the long run alone survive," four years before Spencer coined the phrase "survival of the fittest" in his *Principles of Biology*, which Darwin later adopted.[94]

So how did they envision the relationship of killing to thriving in their developing understanding of the struggles in which all organisms are entwined? Comparing Darwin's writings on biogeography with his personal geopolitics, historian James Moore argues that Darwin's language in *Origin of Species*, even more so in *Descent of Man*, and in letters written from the late 1850s to the mid-1870s was unapologetically imperialistic: "At some future period . . . the civilized races of man will almost certainly exterminate and replace throughout the world the savage races. At the same time the anthropomorphous apes . . . will no doubt be exterminated."[95] In discussing "Natural Selection as Affecting Civilized Nations" in *Descent of Man*, Darwin attributes the success of the civilized to the accumulation of property passed on to children. To be sure, the inheritance of property gives them a "start [un]fair in the race for success. But this is far from an unmixed evil; for without the accumulation of capital the arts could not progress; and it is chiefly through their power that the civilized races have extended, and are now everywhere extending, their range, so as to take the place of the lower races."[96]

Morgan's research with the beavers prompted him to reiterate his concerns about humans' eradication of whole "families and orders of animals," which he had expressed at least since he wrote "Mind or Instinct."[97] Yet his concerns did not keep him from having them killed to use as props in his photographs of their dams.

He is sure to have read Darwin's words on the success of the civilized because they appeared in Darwin's chapter in *Descent* "On the Development of the Intellectual and Moral Faculties during Primeval and Civilised Times," where Darwin cited Morgan's work. So it is striking that in *Ancient Society*, published in 1877, Morgan explicitly rejected such a vision of human success. He ended his account of "the lines of human progress from savagery through barbarism to civilization" not by exalting civilization, but by deploring its foundation in "the new property career of mankind," which in fostering ever-greater inequalities of wealth and power for individuals will destroy society unless the "human mind" devises an entirely new conception of progress. His model for the "revival, in a higher form, of . . . liberty, equality, and fraternity" was not the United States but the "ancient gentes," that is, the Iroquois—and he stopped investing in the Ely brothers' mining schemes (now silver mines in Utah).[98] Morgan's last work, *Houses and House-Life of the American Aborigines*, explored the historical form of sociality organized around the giving and receiving of hospitality, which might ultimately be revised in new forms of liberty, equality, and fraternity for human beings in the United States and worldwide were we all to adopt the ways of our aboriginal forebears in North America.

Darwin in his later life published *The Formation of Vegetable Mould through the Action of Worms, with Observations on Their Habits* (1881). This was not an entirely new topic for him either. He had presented a paper to the London Geological Society on vegetable mold in 1837, a zoological-geological work on worms' creation of vegetable mold that coincided with his growing interest in agriculture and animal and plant breeding, from which he got his analogy between artificial and natural selection.[99] In January 1872, he wrote to Asa Gray, "I have taken up an old subject which formerly interested me, namely the amount of earth brought to the surface by worms," asking him if he was familiar with such "little vermiform piles of earth" in the United States.[100]

In *Formation of Vegetable Mould* Darwin expanded his original argument by adding more supporting data and putting his observations in England into a comparative and historical framework. His examination of the worms' "actions" and "habits"—seizing objects, excavating, lining and plugging up burrows, piling stones, ejecting castings—soon expanded into a survey of what Morgan would have called their "works." Darwin now found that "some degree of intelligence appears to be exhibited in this work—a result which has surprised me more than anything else in regard to worms." His analysis of how worms drag new kinds of leaves to their burrows (requiring them to decide where best to seize them—by the base, middle, or tip) is so like Morgan's account of how beavers and ants move wood, stones, and grains as to suggest that Morgan's *American Beaver* might have prompted Darwin's return to the earthworms.[101] Darwin marked his copy where Morgan wrote: "Personal labor of every kind and description depends upon, as well as evinces, the continuous operation of a mental principle."[102]

Yet Darwin retained the term "instinct" to refer to what he variously called "inherited habit" or "inherited knowledge." Furthermore he drew his support for granting the worms "some degree of intelligence" not from Morgan, but from Romanes: "Mr. Romanes, who has specially studied the minds of animals, believes that we can safely infer intelligence, only when we can see an individual profiting by its own experience."[103] His correspondence shows that he might earlier have ascribed all the worms' actions and habits to instinct, for he wrote to Romanes on April 16, 1881, after sending the book to the printer: "your letter on intelligence was very useful to me and I tore up and re-wrote what I sent you. I have not attempted to define intelligence; but have quoted your remarks on experience, and have shown how far they apply to worms. It seems to me, that they must be said to work with some intelligence, anyhow they are not guided by a blind instinct."[104]

The worms make burrows, but not lodges, dams, ponds, and canals. They are perhaps the humblest of all creatures in the centuries-long biblical tradition that Darwin and Morgan shared, lower on the scale of nature even than the humble rodent. They are not simply nocturnal and burrowing, but subterranean. They are not associated with building, but with decay and death. Yet ultimately Darwin credited the lowly worm with forming the earth itself. Worms do not kill other animals, but they will eat them. They are the means through which even humans will return to the biblical dust whence they came, passing through the intestines of worms and cast forth again to nourish new life.

BEAVERS, WORMS, HUMANS: A BIOCULTURAL SYNTHESIS?

Morgan portrayed the American beaver in the frontispiece to his book standing tall, as if to illustrate one of the most vivid passages in his conclusion: "When a beaver stands for a moment and looks upon his work, evidently to see whether it is right, and whether anything else is needed, he shows himself capable of holding his thoughts before his beaver mind; in other words, he is conscious of his own mental processes." Darwin himself underlined this passage.[105] When Darwin sent the manuscript of his worms book to Romanes for his opinion on whether the worms were acting with intelligence, Romanes wrote back on March 7, 1881, that he should clarify that "intelligence does not imply self-consciousness." And so it was. In his collection of Darwin's *Life and Letters*, his son quotes a reviewer of the worm book: "In the eyes of most men . . . the earthworm is a mere blind, dumb, senseless, and unpleasantly slimy annelid. Mr. Darwin undertakes to rehabilitate his character, and the earthworm steps forth at once as an intelligent and beneficent personage, a worker of vast geological changes, a planer down of mountain sides . . . a friend of man . . . and an ally of the Society for the preservation of ancient monuments."[106] Self-conscious, the worm was not.

Figure 8. Photograph of stuffed beaver with Morgan's instruction to the engraver. From Lewis Henry Morgan Papers, box 11, folder 3. Courtesy of the Rush Rhees Library, Rare Books and Special Collections, University of Rochester.

The consciousness of humans and other animals has continued to be debated to the present day, yet perhaps the Cambridge Declaration on Consciousness of July 7, 2012, marks a new departure. The document, signed by a self-described "prominent international group of cognitive neuroscientists, neuropharmacologists, neurophysiologists, neuroanatomists and computational neuroscientists," declares:

> The absence of a neocortex does not appear to preclude an organism from experiencing affective states. Convergent evidence indicates that non-human animals have the neuroanatomical, neurochemical, and neurophysiological substrates of conscious states along with the capacity to exhibit intentional behaviors. Consequently, the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness. Non-human animals, including all mammals and birds, and many other creatures, including octopuses, also possess these neurological substrates.[107]

Just as did Darwin and Morgan in the 1860s, the signers of the Cambridge Declaration based their assessment first on the comparative anatomy of human and nonhuman animals. They have yet to incorporate in a similar fashion what Morgan called "their artificial works . . . their habits, their mode of life, and their mutual relations."[108]

Lydia Fisher and Tina Gianquitto, drawing on the work of Lennard Davis (see the introduction to this volume), ask us to consider the possibilities of a biocultural synthesis in which we might be able to comprehend such persisting distinctions in a common analytical framework. In this essay I have compared how Darwin and Morgan, perhaps more subtly aware of each other's work than their one meeting might suggest, tried to bridge disparate sources of data on humans and other animals. They did so by focusing on the analysis of instinct and intelligence, a body-mind distinction that Darwin retained in principle, but perhaps not ultimately in practice, and that Morgan sought always to obviate.

How can we go further? Perhaps by asking, as we do here in this section of the book, about the limits of species in thinking about the intimacy of relations among such creatures as humans, beavers, and worms. Where do the boundaries of organisms lie? Could the physiology of beavers include structures like lodges and dams that become essential to their well-being in the way that termites' mounds come to function as an external lung, or worms' burrows as extended kidneys? This is the argument of zoologist J. Scott Turner in *The Extended Organism* (2005). Could we in anthropology develop a convergent theory of humans' housing along the lines exemplified in Tim Ingold's *Being Alive: Essays on Movement, Knowledge and Description* (2011), combining physiology, phenomenology, and political economy in the process? Could those of us working in the social sciences and humanities reconceive our theories of embodiment in a world in which we are beginning to

grasp that our bodies are made of others' (including the bacteria living on and in us, which outnumber our human cells by a factor of ten to one), if indeed such a distinction is viable, given that we cannot live apart?[109] If in killing others we kill ourselves, how might we reimagine our intertwined lives and deaths?

NOTES

All of the citations in this essay are to the original editions of the works, to keep the analysis in the historical context. All of the original works are available through Google Books.

This essay is based on archival research in the Lewis Henry Morgan Papers, Department of Special Collections and Rare Books, Rush Rhees Library, Rochester University; and the Bentley Historical Library, University of Michigan. Thanks to Karl Sanford Kabelac, Melissa Mead, Katie Clark, and Lori Birrell for their archivist expertise; to Alan Harnik, Elizabeth Roberts, Thomas R. Trautmann, and Katherine Verdery for their careful readings of earlier drafts; to the participants in the combined Social-Cultural Anthropology and Anthropology-History Workshops at the University of Michigan (Mar. 28, 2013) for their many insights; and above all to Lydia Fisher and Tina Gianquitto for conceiving *America's Darwin* in such broad interdisciplinary terms, for their many helpful questions, and for their close editorial scrutiny.

1. See Thomas R. Trautmann, *Lewis Henry Morgan and the Invention of Kinship* (Berkeley: University of California Press, 1987).

2. See, for example, ibid., 173–75; and Elisabeth Tooker, "Lewis H. Morgan and His Contemporaries," *American Anthropologist* 94 (1992): 357–75.

3. Lewis Henry Morgan, *The American Beaver and His Works* (Philadelphia: Lippincott, 1868; rpt., New York: Dover, 1986). Hereafter, citations to the original edition will be given in the text.

4. See Philip Howard Gray, "The Early Animal Behaviorists: Prolegomenon to Ethology," *Isis* 59, no. 4 (1968): 372–83; and Timothy D. Johnston, "Three Pioneers of Comparative Psychology in America, 1843–1890," *History of Psychology* 6, no. 1 (2003): 14–51, 15, 41. Morgan mentions neither LeConte nor Bascom.

5. Blake McKelvey, "When Science Was on Trial in Rochester: 1850–1890," *Rochester History* 8, no. 4 (Oct. 1946): 6.

6. A. G. [Asa Gray], "Review of Darwin's Theory on the Origin of Species by Means of Natural Selection," *American Journal of Science and Arts*, ser. 2, 29, no. 86 (Mar. 1860): 153–84; Anonymous [Asa Gray], "Discussion between Two Readers of Darwin's Treatise on the Origin of Species, upon Its Natural Theology," *American Journal of Science and Arts*, ser. 2, 30, no. 89 (Sept. 1860): 226–39; Anonymous [Asa Gray], "Darwin on the Origin of Species," *Atlantic Monthly* 6, no. 33 (July 1860): 109–16, and 6, no. 34 (Aug. 1860); Anonymous [Asa Gray], "Darwin and His Reviewers," *Atlantic Monthly* 6, no. 36 (Oct. 1860): 425; Louis Agassiz, "[Review of] *On the Origin of Species*," *American Journal of Science and Arts*, ser. 2, 30 (July 1860): 142–54. For the debates at the special meetings, see *Proceedings of the American Academy of Arts and Sciences* 4 (1860): 410–16, 424–31.

7. Morgan, "Agassiz: Theory of the Diverse Origin of the Human Race," read before the Club, May 16, 1859, Lewis Henry Morgan Papers (A.M85), Department of Rare Books and Manuscripts, Rush Rhees Library, University of Rochester, New York, MS 44, p. 9.

8. Thomas R. Trautmann and Karl Sanford Kabelac, *The Library of Lewis Henry Morgan and Mary Elizabeth Morgan* (Philadelphia, Pa.: American Philosophical Society, 1994), 81–82.

9. Two years earlier, at Gray's suggestion, Morgan had sent Darwin a copy of the paper he gave at the meetings of the American Academy of Arts and Sciences in Boston in February 1868: "A Conjectural Solution of the Origin of the Classificatory System of Relationship," *Proceedings of the American Academy of Arts and Sciences* 7 (1868): 436–77, which anticipated the last chapter of *Systems* (Morgan to Darwin, Aug. 9, 1870, in Frederick Burkhardt et al., eds., *The Correspondence of Charles Darwin* [Cambridge: Cambridge University Press, 1985–], 18:228). He probably sent *The American Beaver and His Works* around the same time; Darwin lent a copy to a neighbor (Wilson to Darwin, Feb. 12, 1869, in Burkhardt et al., *Correspondence*, 16:75).

10. Morgan, *Systems of Consanguinity and Affinity of the Human Family* (Washington, D.C.: Smithsonian Institution, 1871), 479–80; Morgan to Darwin, Aug. 9, 1870, in Burkhardt et al., *Correspondence*, 18:228.

11. Darwin to Morgan, Aug. 11, 1870, in Burkhardt et al., *Correspondence*, 18:229.

12. Darwin to Morgan, June 7, 1871, in Burkhardt et al., *Correspondence*, 19:433.

13. Morgan Papers, European Journals, 5:91–92; and Leslie A. White, ed., "Lewis H. Morgan's European Journal," *Publications of the Rochester Historical Society* 16 (1937): 219–389, 339. In London about a month later, Morgan saw the published edition of *Systems* for the first time and arranged for copies to be sent to five scholars in England, including Darwin, Huxley, and Spencer (Morgan Papers, European Journals, vi, 110–11; White, "Morgan's European Journal," 371).

14. Mario A. Di Gregorio with N. W. Gill, *Charles Darwin's Marginalia* (New York: Garland, 1990), 1:602.

15. Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (London: John Murray, 1871), 1:181–82, 2:358–59, 365; the 1868 paper was "A Conjectural Solution of the Origin of the Classificatory System of Relationship," cited above.

16. Darwin, *Descent*, 1:37–38, 46.

17. Ibid., 1:48–49, 104–6.

18. George John Romanes, *Mental Evolution in Animals, with a Posthumous Essay on Instinct by Charles Darwin* (London: Kegan Paul, Trench, 1883), 329. Romanes's choice not to name the sources that damned Morgan's work is astonishing given the common practice of scholars across the Atlantic of giving every datum its human author. Romanes's main source might have been the Scottish surgeon and explorer of Canada John Rae, whose paper on birds and mammals, "The Hudson's Bay Company's Territory, and of the Arctic Coast of America," he presented to the Linnean Society a few years later. See *Journal of the Linnean Society, Zoology* 20 (1890): 136–45.

19. Romanes knew this work because Darwin sent him the manuscript, or at least the part of it dealing with what Darwin eventually called evidence of worms' intelligence.

Perhaps Romanes dismissed the work's significance for substantiating the intelligence of animals because, as he wrote to Darwin, earthworms are a borderline case. Romanes to Darwin, Mar. 7, 1881, http://www.darwinproject.ac.uk/entry-13077 (accessed Oct. 26, 2012).

20. Darwin, "Appendix: A Posthumous Essay on Instinct by Charles Darwin," in Romanes, *Mental Evolution*, 353–84, 384. In the conclusion of "Instinct" in *Origin* (1859), 244, Darwin omitted the emphatic capitals and a couple of the animals.

21. William James, "What Is an Instinct?," *Scribner's Magazine* 1 (Mar. 1887): 355, 360, 363, 365. See chapter 24, "Instinct," in William James, *The Principles of Psychology* (New York: Henry Holt, 1890), 2:383–441, which "almost exactly" reprinted James's articles on instinct in *Scribner's Magazine* and another in *Popular Science Monthly* in 1887 (ibid., 2:383). On the influence of James's work in evolutionary psychology, see, for example, David M. Buss, *Evolutionary Psychology: The New Science of the Mind*, 3rd ed. (Boston: Pearson/Allyn and Bacon, 2008), 2–35.

22. Morgan, "Mind or Instinct: An Inquiry concerning the Manifestation of Mind by the Lower Orders of Animals," *Knickerbocker* 22 (Nov.–Dec. 1843): 414–20, 507–15.

23. Paul H. Barnett et al., eds., *Charles Darwin's Notebooks, 1836–1844: Geology, Transmutation of Species, Metaphysical Enquiries* (London: British Museum/Cambridge University Press, 1987), 228–29 (B 231–32). Darwin's insertions are indicated by « »; his deletions by ‹ ›.

24. See Gillian Feeley-Harnik, "'An Experiment on a Gigantic Scale': Darwin and the Domestication of Pigeons in London," In *Where the Wild Things Are Now: Domestication Reconsidered*, ed. Molly Mullin and Rebecca Cassidy (Oxford: Berg, 2007), 147–82.

25. See, for example, Charles T. Leavitt, "Attempts to Improve Cattle Breeds in the United States, 1790–1860," *Agricultural History* 7, no. 2 (1933): 51–67; Benjamin R. Cohen, *Notes from the Ground: Science, Soil, and Society in the American Countryside* (New Haven, Conn.: Yale University Press, 2009).

26. Jedediah Morgan's will, admitted to probate court on April 28, 1827, Morgan Papers, MS 108.

27. Robert R. Livingston, *Essay on Sheep: Their Varieties—Account of the Merinos of Spain, France, &c.* (n.p.: Hill, n.d.), 3, which was made from stereotypes of the second edition (1813); the first edition (1809) was printed by order of the New York State Legislature.

28. For the importance of contemporary philology in the development of Morgan's arguments, see Trautmann, *Lewis Henry Morgan and the Invention of Kinship*, 58–83; and Tooker, "Lewis Henry Morgan"; for its persistence, see Trautmann, "The Whole History of Kinship Terminology in Three Chapters: Before Morgan, Morgan, and After Morgan," *Anthropological Theory* 1, no. 2 (2001): 268–87.

29. Daniel B. Klein and John Majewski, "Economy, Community, and Law: The Turnpike Movement in New York, 1797–1845," *Law and Society Review* 26, no. 3 (1992): 469–512, map 2.

30. Horatio Gates Spafford, *A Gazetteer of the State of New York* (Albany, N.Y.: Southwick, 1913), 295; Temple R. Hollcroft, "A Brief History of Aurora: IV. Cayuga Lake Academy," *Wells College Alumnae News* (1957): 22–23.

31. Hollcroft, "A Brief History," 22–23.

32. Salem Town, *An Analysis of the Derivative Words in the English Language; or, A Key to Their Precise Analytical Definitives, by Prefixes and Suffixes* (Auburn, Mass.: Ivison; New

York: N&J White, 1835), 3–4, which was produced in over thirty editions between 1835 and 1885 (Hollcroft, "A Brief History," 23).

33. Codman Hislop, *Eliphalet Nott* (Middletown, Conn.: Wesleyan University Press, 1971), 209–33.

34. The Union College merit rolls, which are available for some semesters in 1839 and 1840, show some of Morgan's courses.

35. When Cicero couples "reason and speech" as humans' highest attributes he actually uses the words *ratione et oratione*. See *De Oratore* (Cambridge, Mass.: Loeb Library, 1913), 1:16.

36. Kames's *Elements* had become a textbook at Union College in 1802, as at many other American universities since the 1780s. See Hislop, *Eliphalet Nott*, 237.

37. These included a commencement address at Union College, "On History," on July 22, 1840; two lectures at Cayuga Academy: "Against Non-Resistance," on April 17, 1840, just before his graduation from Union College, and "On Geology," in April 1841; and at least three lectures at temperance meetings in towns around Aurora in 1842 and 1843 (Morgan Papers, MSS 1, 2, 4, 5, 7).

38. Temple R. Hollcroft, "A Brief History of Aurora: XXXII. Lewis Henry Morgan, Father of American Anthropology," *Wells College Alumnae News* (Fall 1958): 15–17, 15.

39. Charles Ayrault Dewey, "Sketch of the Life of Lewis H. Morgan with Personal Reminiscences," *Rochester Historical Society Publication Fund Series* 2 (1923): 29–45, 37. See Morgan's "Discussion of Organizing a Rochester Academy of Science, 1860," Morgan Papers, MS 46.

40. Jonathan Pearson, trans., *Early Records of the City and County of Albany, and Colony of Rensselaerswyck* (Albany, N.Y.: Munsell, 1869).

41. Parker, then sixteen years old, was interpreting for the Senecas from Tonawanda in Albany about a land dispute. Morgan reported their meeting in his address at the meeting of the Grand Order on April 17, 1844 (Morgan Papers, MS 9). Parker identified himself as the "Translator and Reporter" or "Interpreter" in the many reports he made to Morgan, which Morgan transcribed into his journals, including material from 1844 onward. For example, Journal 1, packet on "Speech of Sose-ha-nä . . . September 1848 . . . Prepared by Ely S. Parker," Morgan Papers.

42. Lewis Henry Morgan, "Aristomenes the Messenian," *Knickerbocker* 21 (Jan. 1843): 25–30, 30; Morgan, "Thoughts at Niagara," *Knickerbocker* 22 (Sept. 1843): 193–96; Morgan, "Vision of Kar-is-ta-gi-a, a Sachem of Cayuga," *Knickerbocker* 24 (Sept. 1844): 238–45.

43. Morgan, "Mind or Instinct," 414–15, 417, 511, 515.

44. Henry Schoolcraft, *Algic Researches* (New York: Harper and Brothers, 1839), 1:42, which is based on even stronger statements in Schoolcraft's earlier paper "Mythology, Superstitions, and Languages of the North American Indian," *Literary and Theological Review* 2 (Mar. 1835): 96–121. There he stated : "They believe not only that every man, but also, *that every animal has a soul*. And . . . *they make no distinction between instinct and reason*. Every animal is supposed to be endowed with a reasoning faculty" (103). Since Morgan's research on beavers with "Ojibwa trappers" (Anishinaabeg) around Lake Superior in the 1860s confirms Schoolcraft's observations, I note that Schoolcraft's main source of data was his wife, Jane Johnston/Bame-wa-wa-ge-zhik-aquay, whom he married in 1823, and her

mother, who were descendants of a prominent Anishinaabeg family; her father was a Scotch Irish fur trader. See Jane Johnston Schoolcraft, *The Sound the Stars Make Rushing through the Sky: The Writings of Jane Johnston Schoolcraft*, ed. Robert Dale Parker (Philadelphia: University of Pennsylvania Press, 2007).

45. William Cowper and James Thomson, *The Works of Cowper and Thomson* (Philadelphia, Pa.: Grigg and Elliot, 1841); see page 99 for Morgan's epigraphs and a further passage quoted in "Mind or Instinct," 5:420. An unidentified two-volume edition of Cowper's poetry was also among Morgan's early books; see Trautmann and Kabelac, *Library*, 140.

46. See David Perkins, *Romanticism and Animal Rights* (Cambridge, Mass.: Harvard University Press, 2003).

47. Nora Barlow, ed., *The Autobiography of Charles Darwin, 1809–1882: with Original Omissions Restored* (New York: Harcourt Brace, 1958), 138.

48. On Coleridge's poem, see Perkins, "Work Animals, Slaves, Servants: Coleridge's Young Ass," in his *Romanticism and Animal Rights*, 104–15.

49. See Trautmann and Kabelac, *Library*, 212, for a description of the book, which is now in the Morgan Papers.

50. I have so far found no information on the subject of Agassiz's lectures in Rochester. See Louis Agassiz, "Sketch of the Natural Provinces of the Animal World and Their Relation to the Different Types of Man," in *Types of Mankind; or, Ethnological Researches, Based upon the Ancient Monuments, Paintings, Sculptures, and Crania of Races, and upon Their Natural Geographical, Philological and Biblical History*, ed. Josiah Clark Nott and George R. Gliddon (Philadelphia, Pa.: Lippincott, Grambo, 1854), lviii–lxxviii, map, republished in *Edinburgh New Philosophical Journal* 59, no. 114 (1854): 347–63, later that year.

51. Dewey gave three papers on "Species" to the Club in 1859–1860, then two more on Agassiz's views on classification in 1862–63. See McKelvey, "When Science," 22; and Morgan, "The Andes," MS 40, Morgan Papers. His paper on Agassiz (MS 44) was based on Agassiz's "Essay on Classification," in Louis Agassiz, *Contributions to the Natural History of the United States of America*, vol. 1 (Boston: Little, Brown; London: Trübner, 1857), 1–136.

52. John S. Burt, *They Left Their Mark: A Biography of William Austin Burt* (Rancho Cordova, Calif.: Landmark Enterprises, 1985), 55, 57–58. Chippewa and Ojibwa (also spelled Chippewe and Ojibwe) are names the U.S. government used for Native Americans in the Lake Superior region who called (and still call) themselves Anishinaabeg. Morgan tended to use the term Chippewa in earlier writings and Ojibwa later. I have followed his usage.

53. Manuscript of a short article on beavers in Morgan Papers II (box for *The American Beaver*), which is probably "Beaver Dams and Lodges," presented to the Club on October 16, 1860 (Dewey, "Sketch," 38) in revision for chapter 3 (hereafter cited as "Beaver Dams and Lodges").

54. Morgan, *American Beaver*, 247n.

55. Thomas Benton Brooks, *Iron-Bearing Rocks (Economic) [of the Upper Peninsula of Michigan]* (New York: Brien, 1873); *Reports* (Michigan Geological Survey), vol. 1, pt. 1, 10; Lake Superior Iron Company [Hemen B. Ely, President], *Exhibit of the Condition and Prospects of the Lake Superior Iron Company, June, 1853* (New York: Bryant, 1853).

56. See *Proceedings of the American Association for the Advancement of Science* 10 (1856): pt. 1:v–vii and pt. 2:222–28 (papers), and pt. 1:xlvii (Morgan's new membership), xxiii and

xxxi (Agassiz's and Gray's memberships). Darwin's correspondence shows that Agassiz (since 1841), Dana (since 1849), and Gray (since 1855) were already correspondents, the others never. The locations of the AAAS meetings in 1848–60 show that it was oriented toward an East Coast constituency.

57. Morgan Papers, box 27.11. The file held twenty-one clippings in 1872, the year of the latest. Morgan's fieldwork, documented in his journals (3, 4, 5, 6), eventually included four trips to the western frontier between 1859 and 1862, at least seven return visits to Marquette between 1860 and 1866, and another in 1874.

58. Timothy D. Johnston, "An Early Manuscript in the History of American Comparative Psychology: Lewis Henry Morgan's 'Animal Psychology' (1857)," *History of Psychology* 5, no. 4 (2002): 323–55; Lewis Henry Morgan, "Animal Psychology" (1857), transcribed by Timothy D. Johnston in 2002, from the original in the Morgan Papers (MS 41, box 22, folder 41), showing Morgan's corrections. http://www.lib.rochester.edu/IN/RBSCP/Manuscript_Reg/ATTACHMENTS/AnimalPsychology.pdf.

59. *Proceedings of the American Association for the Advancement of Science* 10 (1856): pt. 2, 193–97, 196.

60. Morgan, "Laws of Descent," *Proceedings of the American Association for the Advancement of Science* 11 (1857): 132–148, 140.

61. See *Proceedings of the Boston Society of Natural History* 6 (1856–59): 56, 155, 160–65, for the reading on Oct. 1, 1856, and its publication in the report of the meeting of Mar. 4, 1857, in issue no. 11 (May 1857), quotes at 160–61, 165. See Peter Scheitlin, *Versuch einer vollständigen Thierseelenkunde* (Stuttgart: Cotta, 1840), on the historical formation of what he eventually names a *Thierpsychologie*. Weinland presented his ideas once more in the United States before returning to Germany. See "A Method of Comparative Animal Psychology," *Proceedings of the American Association for the Advancement of Science* 12 (May 1858): 256–266, which is abridged in "Some Principles of Animal Psychology," *American Journal of Science and Arts* 27 (May 1859): 1–5.

62. Although Morgan draws on Cicero's work, as he did in his essay of 1843, "the Mutae" is not a phrase the ancients used in writing about animals. In Cicero's *De natura deorum*, which Morgan cites most, Cicero's terms are *bestia* and *animantes*. In *The American Beaver*, he keeps many of his classical references, but he abandons his Latinate phrase for "the mutes" (see esp. 248–84).

63. Morgan, "Animal Psychology," 23–24, 25.

64. Morgan Papers, Journal 2:10.310. Mrs. Cameron was Sophie Nolan, originally from Sault Ste. Marie; the couple raised their eleven children to be bilingual in Chippewa and English. See Loren R. Graham, *A Face in the Rocks: The Tale of a Grand Island Chippewa* (Washington, D.C.: Island Press/Shearwater, 1995), 93, which is based on conversations with Julia Cameron, granddaughter of Sophie Nolan and William Cameron, in Au Train, Michigan, beginning in the 1950s (7–9).

65. Morgan Papers, Journal 2:10.346; Journal 2:11.357–420; Morgan, circular letter dated "January, 1859," including paper titled "Laws of Consanguinity and Descent of the Iroquois" (Rochester, N.Y.: Steam Press of A. Strong & Co., n.d.); Morgan, "Agassiz" (MS 44); Morgan "System of Consanguinity" (MS 45).

66. See Trautmann, *Lewis Henry Morgan and the Invention of Kinship*, 104–14.

67. This was the local term for an Ojibwa with French kin whose first European language was French, regardless of whether he also spoke English; the term was dismissive if not pejorative.

68. Morgan, Journal 4:2.196.

69. Darwin to Gray, Apr. 3, 1860, in Burkhardt et al., *Correspondence*, 8:140.

70. Morgan, "Beaver Dams and Lodges," 5.

71. Morgan, Journal 4:2.200, 208.

72. Morgan, *American Beaver*, 11.

73. Ibid., 133.

74. Morgan, Journal 4:2.208–9.

75. Morgan, Journal 4:2.244.

76. Morgan, "Beaver Dams and Lodges," 6, 8.

77. Robert J. Naiman, preface to Morgan, *American Beaver*; Robert J. Naiman, Carol A. Johnston, and James C. Kelley, "Alteration of North American Streams by Beaver," *BioScience* 30, no. 1 (Dec. 1988): 753–62, 761.

78. R. L. Ives, "The Beaver-Meadow Complex," *Journal of Geomorphology* 5 (1942): 191–203; R. Rudemann and W. J. Schoonmaker, "Beaver Dams as Geologic Agents," *Science* 88 (1938): 523–25; Lina E. Polvi and Ellen Wohl, "The Beaver-Meadow Complex Revisited: The Role of Beavers in Post-Glacial Floodplain Development," *Earth Surface Processes and Landforms* 37, no. 3 (Mar. 15, 2012): 332–46.

79. Ellen Wohl, "Landscape-Scale Carbon Storage Associated with Beaver Dams," *Geophysical Research Letters* 40 (2013): 1–6, 1. See Polvi and Wohl, "Beaver-Meadow Complex Revisited," 332; and Natalie Kramer, Ellen E. Wohl, and Dennis L. Harry, "Using Ground Penetrating Radar to 'Unearth' Buried Beaver Dams," *Geology* 40, no. 1 (2012): 43–46.

80. Michael M. Pollock, Morgan Heim, and Danielle Werner, "Hydrologic and Geomorphic Effects of Beaver Dams and Their Influence on Fishes," in *The Ecology and Management of Wood in World Rivers*, ed. Stan V. Gregory, Kathryn L. Boyer, and Angela M. Gurnell (Bethesda, Md.: American Fisheries Society, 2003), 213–33, esp. 224–30.

81. Polvi and Wohl, "Beaver-Meadow Complex Revisited," 344–45.

82. Morgan, *American Beaver*, 6.

83. Darwin, *Descent*, 1:46.

84. Morgan, *American Beaver*, 137–40; Robert J. Naiman, "Introduction to the Dover Edition," ibid., viii. Donald R. Griffin, *Animal Minds* (Chicago: University of Chicago Press, 1992), 87–100, is still the main follow-up to Morgan's insights.

85. Darwin, *Origin*, 207.

86. Ibid.

87. Morgan, *Systems*, xxii.

88. Morgan, *Ancient Society; or, Research in the Lines of Human Progress from Savagery through Barbarism to Civilization (New York: Henry Holt, 1877)*, 506. See 498–513 for Morgan's synopsis of the stages.

89. Darwin, *The Variation of Animals and Plants under Domestication* (London: John Murray, 1868), 2:404.

90. Morgan, *Ancient Society*, 19–27.

91. Morgan, *Houses and House-Life of the American Aborigines (Washington, D.C.: Government Printing Office, 1881)*, 42–62, esp. 61.

92. Morgan, *American Beaver*, 83.

93. Ibid., 267–68.

94. A. G. [Asa Gray], "Review of Darwin's Theory on the Origin of Species by Means of Natural Selection," *American Journal of Science and Arts*, ser. 2, 29, no. 86 (Mar. 1860): 154, see also 147–48, 150, 156, 170, 172, 174; Herbert Spencer, *The Principles of Biology* (London: Williams and Norgate, 1864), 1:444.

95. Darwin, *Descent*, 1:201, qtd. in James Moore, "Revolution of the Space Invaders: Darwin and Wallace on the Geography of Life," in *Geography and Revolution*, ed. David N. Livingstone and Charles W. J. Withers (Chicago: University of Chicago Press, 2005), 106–32, 119. See also Darwin's extended discussion "On the Extinction of the Races of Man" in *Descent*, 1:236–40; and Moore, "Revolution of the Space Invaders," 109–20.

96. Darwin, *Descent*, 1:169.

97. Morgan, *American Beaver*, 283.

98. Morgan, *Ancient Society*, 562; see letter from Samuel Ely to Morgan, Feb. 17, 1880, Morgan Papers, box 9.1.

99. Charles Darwin, "On the Formation of Mould," read at the meeting of November 1, 1837, and published in *Proceedings of the Geological Society of London* 2 (1838): 574–76, and, slightly revised, in *Transactions of the Geological Society of London*, 2nd ser., pt. 3, 5 (1840): 505–9. See G. Feeley-Harnik, "The Geography of Descent," *Proceedings of the British Academy* 125 (2004): 311–64.

100. Darwin to Gray, Jan. 15, 1872, http://www.darwinproject.ac.uk/entry-8158 (accessed Oct. 23, 2012).

101. Darwin, The *Formation of Vegetable Mould, through the Action of Worms, with Observations on Their Habits* (London: John Murray, 1881), 16; compare 29–43, with Morgan, *American Beaver*, 180, 265–66.

102. Morgan, *American Beaver*, 266; see Di Gregorio and Gill, *Darwin's Marginalia*, 602.

103. See, for example, Darwin, *Formation of Vegetable Mould*, 41–43.

104. Darwin to Romanes, Apr. 16, 1881, in *The Life and Letters of Charles Darwin*, ed. Francis Darwin (New York: Appleton, 1887), 2:419.

105. Morgan, *American Beaver*, 256; Di Gregorio and Gill, *Darwin's Marginalia*, 602.

106. F. Darwin, *Life and Letters*, 2:395.

107. http://fcmconference.org/img/CambridgeDeclarationOnConsciousness.pdf (accessed Oct. 27, 2012).

108. Morgan, *American Beaver*, 6.

109. J. Scott Turner, *The Extended Organism* (Cambridge, Mass.: Harvard University Press, 2005); Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (London: Routledge, 2011); Elizabeth K. Costello et al., "The Application of Ecological Theory toward an Understanding of the Human Microbiome," *Science* 336 (June 8, 2012): 1255–62.

LILIAN CARSWELL

"The Power of Choice"

Darwinian Concepts of Animal Mind in Jack London's Dog Stories

Scholars have long recognized the importance of Charles Darwin to Jack London's intellectual development.[1] London read Darwin's *On the Origin of Species* while still a teenager; studied Darwin, Herbert Spencer, and Thomas Henry Huxley during his semester at the University of California, Berkeley; and brought a copy of the *Origin of Species* with him to the Yukon.[2] However, just as Darwin's ideas "generated profoundly opposed insights and narratives" in the nineteenth century and today, as Gillian Beer observes, so has London's use of Darwin.[3] Critical recognition of Darwin's influence on London has most often taken the form of an emphasis on the importance of the concept of natural selection, or "survival of the fittest," manifested as environmental determinism or Spencer-derived Social Darwinism in London's novels and short stories.[4] While there is no doubt that these philosophical outgrowths of Darwinian evolution constitute major thematic elements in London's writings, a more complete picture has begun to emerge with the contribution of critical investigations such as Bert Bender's work on the notion of sexual selection in American literature, which examines London's "exploration of the sex problem, including its role in his ecological vision," and identifies London as "one of American literature's most perceptive and devoted Darwinians."[5] Although Bender does not discuss London's dog stories, his recognition of the importance of Darwin's theory of sexual selection to London gestures toward another aspect of Darwinian evolution in London's writings that has not received adequate recognition: his conception of animal mind.

For Darwin, the concept of sexual selection and the concept of animal mind were intimately related. Sexual selection, as Darwin defines it in *Origin*, can be the result of male-male competition, "a struggle between the males for possession of the females" where "the result is not death to the unsuccessful competitor, but few or no offspring," but it can also be the result of female choice, as in birds,

"where there is the severest rivalry between the males of many species to attract, by singing, the females."[6] Darwin noted that this phenomenon was widespread throughout most of the animal kingdom.[7] It explained the existence of physical attributes, like large unwieldy antlers or ostentatious plumage, that were unlikely to have arisen by natural selection because they decrease rather than increase an organism's chances of survival. These traits were shaped and retained not because they conferred an advantage in survival, but because they conferred an advantage in mating and thus reproduction. The importance of the mechanism in Darwin's mind is illustrated by the number of pages he devoted to it, nearly two-thirds of the combined volume *The Descent of Man, and Selection in Relation to Sex*. Whereas natural selection was a convenient, if somewhat misleading, term to describe the forces determining an organism's survival (for the concept excluded the notion of a governing agency), sexual selection in the form of female choice returned agency to the world, not in the form of an all-directing Creator, but in the form of dispersed individual subjectivities. As Darwin writes in *Origin*, "if man can in a short time give elegant carriage and beauty to his bantams, according to his standard of beauty, I can see no reason to doubt that female birds, by selecting, during thousands of generations, the most melodious or beautiful males, according to their standard of beauty, might produce a marked effect" (137).

Sexual selection presupposed not just an aesthetic sense but the capacity for conscious choice, which in turn presupposed reason.[8] "Of all the faculties of the human mind," Darwin wrote in *Descent*, "it will, I presume, be admitted that Reason stands at the summit. Few persons any longer dispute that animals possess some power of reasoning. Animals may constantly be seen to pause, deliberate, and resolve" (46). Darwin realized that mental characteristics could be inherited and thus concluded that mind had a physical, not spiritual, basis. Yet Darwin's argument that there was no fundamental difference between human beings and other animals met with special resistance on the issue of reason because of its conflict with the long-held philosophical notion that human beings were uniquely rational agents. Many of Darwin's forerunners believed that animals had some limited power of reasoning, but they also believed that what they perceived as the vastly superior reasoning power possessed by human beings was the source of the human capacity for progress, moral agency, and free will. The ancient Greek philosopher Aristotle and the thirteenth-century Italian philosopher Thomas Aquinas had claimed reason as a uniquely human attribute that allowed human beings to choose and to have free will, and the influential Enlightenment philosopher John Locke had concluded that "the having of general ideas, is that which puts a perfect distinction betwixt man and brutes."[9] In the early nineteenth century, the British natural theologian William Paley had distinguished between "irrational life" ("brutes") and "rational life" ("the human species") and devoted a chapter of *Natural Theology* to dispelling the notion that animals might act out of reason

rather than instinct.[10] Even Alfred Russel Wallace, the co-discoverer of natural selection, publicly denied the possibility that human beings could have arisen by natural selection alone, arguing in "Limits of Natural Selection as Applied to Man" (1869) that natural selection could not have produced human beings with brains as large as we have.[11] It is this "wonderfully developed brain, the organ of the mind" that "raises him far above the highest brutes."[12] In *Descent*, Darwin greets Wallace's declarations with incredulity: "I cannot . . . understand how it is that Mr. Wallace maintains, that 'natural selection could only have endowed the savage with a brain a little superior to that of an ape'" (138).

Darwin rejected the dualistic formulation whereby human behaviors were the product of reason and the behaviors of other animals were the product of instinct. Darwin writes in *Origin* that an "action, which we ourselves should require experience to enable us to perform, when performed by an animal, more especially by a very young one, without any experience, and when performed by many individuals in the same way, without their knowing for what purpose it is performed, is usually said to be instinctive. But I could show that none of these characters of instinct are universal. A little dose . . . of judgment or reason, often comes into play, even in animals very low in the scale of nature" (*Origin*, 234). Proposing a conception of "instinct" as innate, unlearned behavior and of "reason" as the ability to learn from experience, Darwin nevertheless acknowledges the difficulty of recognizing which of these capacities is the primary force behind complex and apparently intelligent behaviors: "The orang in the Eastern islands, and the chimpanzee in Africa, build platforms on which they sleep; and as both species follow the same habit, it might be argued that this was due to instinct, but we cannot feel sure that it is not the result of both animals having similar wants and possessing similar powers of reasoning" (*Descent*, 36). It may well be instinct that leads apes to select certain fruits above others, Darwin concedes, but without adequate observation, we "cannot feel sure that the apes do not learn from their own experience or from that of their parents what fruits to select" (ibid.). Repeatedly encountering the problem of circularity—that of confirming existing beliefs by interpreting behaviors with a set of assumptions already in mind—Darwin stresses that naturalists should study animal behavior carefully and with an open mind before drawing conclusions. It "is a significant fact," he points out, "that the more the habits of any particular animal are studied by a naturalist, the more he attributes to reason and the less to unlearnt instincts" (47).

If there was no sharp distinction to be made between human beings and other animals on the grounds of reason and instinct, there was also no distinction to be made on the grounds of their possession or lack of free will. In Darwin's view, the theological concept of free will was untenable, whether its supposed possessor was human or nonhuman. Despite the fact that we experience ourselves as agents, Darwin noted, desires and intentions are the result of bodily "organization," or the

capacities an organism's "senses give it of pain or pleasure."[13] If, as he observed, the "above views would make a man a predestinarian of a new kind" because of their determinism, Darwin's denial of free will did not extend to a denial of the faculty of conscious choice. To the contrary, although constrained by "hereditary disposition," "instincts," and chance circumstances, choice was possible and played an important role in the lives of many, if not most, animals.[14]

By the late nineteenth century, most biologists in the United States accepted evolution but resisted Darwin's mechanism of natural selection, proposing alternative mechanisms for evolution without any real means of progressing beyond the standstill until, several decades later, natural selection was integrated with genetics to produce what Julian Huxley termed in 1942 "the evolutionary synthesis."[15] This "eclipse of Darwinism" was complicated by the popular acceptance of Herbert Spencer's Social Darwinism, which conceived of evolution as fundamentally progressive and applied the concept of natural selection (reconceived as ruthless competition, resulting in the "survival of the fittest") to human societies and races. Neither English nor American biologists readily embraced Darwin's concept of sexual selection by female choice because of the mental phenomena it entailed. As Erika Milam observes, "for late nineteenth-century biologists, female choice presupposed both a sense of aesthetic appreciation and an ability to choose rationally based on this aesthetic sensibility—mental attributes they were hesitant to ascribe to animal minds."[16] One important exception to this general reluctance was Darwin's young friend the English evolutionary biologist and physiologist George Romanes. Romanes acknowledged sexual selection as the mechanism behind the development of traits that exemplified "beauty" just as surely as he accepted natural selection as the mechanism behind the development of traits that were "life-preserving."[17] Founding a new discipline called "comparative psychology," Romanes took up Darwin's hint at the end of *Origin* that "psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation" (*Origin*, 458) and set out systematically to investigate subjective phenomena in animals in light of the physical and psychological continuity entailed by evolution.[18] In *Mental Evolution in Animals* (1884), Romanes identifies "choice" as his "Criterion of Mind": "the distinctive element of mind is consciousness," and "the test of consciousness is the presence of choice."[19]

The proposition that animals have minds, and in particular that they can reason and make conscious choices, was not just a problem for science; it posed a problem for every institution and cultural assumption that was predicated on the notion of human uniqueness. In the early years of the twentieth century, disagreement over whether animals could reason fueled a debate that flared up in the pages of the popular American press. The "nature fakers" controversy centered on the question of "truth" about wild animals, particularly their mental capacities, and raised ancillary questions concerning the respective roles of literature and science

in the creation and dissemination of conceptions of reality.[20] Animal stories had proliferated in the United States during the late nineteenth century as a result of numerous social developments that arose alongside, and sometimes in connection with, the publication and subsequent popularization of Darwin's work. These social developments included the humane movement, which taught kindness to animals and produced sentimental narratives in the first-person voice of their animal protagonists (most famously, the English writer Anna Sewell's 1877 *Black Beauty*, which was published in an American edition in 1890); industrialization, which caused the mass movement of people from rural to urban areas, thereby increasing their distance from the older patterns of animal exploitation associated with the farm and exposing them to new, sometimes heightened forms of animal abuse in the city; the American wilderness preservation movement led by John Muir; the rise of Audubon Societies, which were dedicated to stopping the mass destruction of wild birds, particularly through egg, feather, and nest collection; and finally, the nature-study movement, an educational reform movement that sought to nurture children's relationship to the natural world through the inclusion of stories about wild animals in school curricula.[21] The animal stories produced in connection with the humane movement focused primarily on domestic animals and were clearly allied with the sentimental, reformist tradition.[22] With the proliferation of wild animal stories, which were sometimes written by people with little interest in or familiarity with actual wild animals, critics began increasingly to object that the wild animal "romances" had gone too far in their sentimentalism and in their representation of fictional natural history scenes as fact.[23] In a review of several books on nature, one critic wrote that when "the romancers claim to be explorers in animal psychology and assiduous contributors to natural history the startled scientist scans in vain the unpaid pages of the chronicles of research in these fields for some revelations of their discoveries."[24] The problem was that "the credulous public as well as the naturalist will have difficulty in separating the fabric of romance from the framework of facts."[25]

Thus when Jack London first mentioned his "dog story" to George Brett, soon to be his publisher at the Macmillan Company, in February 1903, he was careful to distance it from the sentimental animal stories that had consumed the reading public: "It is an animal story, utterly different in subject & treatment from the rest of the animal stories which have been so successful; and yet it seems popular enough for the *Saturday Evening Post*, for they snapped it up right away."[26] Brett concurred in a letter of March 1903: "I like the story very well indeed, although I am afraid it is too true to nature and too good work to be really popular with the sentimentalist public."[27] The psychological implications of Darwinian evolution formed the foundation for what London intended to be scientifically plausible and realistic representations of mental phenomena in his animal protagonists. For London, as for Darwin and Romanes, the behavior of animals, whether human

or nonhuman, could not be explained by instinct or reason alone. Reflecting the influence of Darwin and the young science of comparative psychology, London's dramatizations of animal minds in his most famous fiction, *The Call of the Wild* (1903) and *White Fang* (1906), in his lesser-known anecdotes about dogs in "The Other Animals" (1908), and in his short story "Brown Wolf" (1906) challenged deeply entrenched views about the mental capacities of animals.[28]

Ironically, Brett's assessment that London's writing was "true to nature" was precisely the grounds on which London's animal fiction would be later questioned. The controversy began in 1903 when the well-known American naturalist and writer John Burroughs charged several popular writers of wild animal stories with producing "sham natural history."[29] Burroughs accused the American minister William J. Long and Canadian naturalist-writers Ernest Thompson Seton and Charles G. D. Roberts of falsifying the facts of natural history. Seton and Long, Burroughs wrote in "Real and Sham Natural History," "repeatedly" cross "the line between fact and fiction" and make "a deliberate attempt . . . to induce the reader to cross, too, and to work such a spell on him that he shall not know that he has crossed and is in the land of make-believe. Mr. Thompson Seton says in capital letters that his stories are true, and it is this emphatic assertion that makes the judicious grieve. True as romance, true in their artistic effects, true in their power to entertain the young reader, they certainly are but true as natural history they are not. . . . There are no stories of animal intelligence and cunning on record, that I am aware of, that match his."[30] In 1907 President Theodore Roosevelt challenged London's "make-believe" realism, inspiring London to mount an impassioned defense of his portrayal of animal reason. The resulting essay, "The Other Animals," reveals London's thinking about animal minds in a way that opens a window onto the representations of animal consciousness in his fiction.

Although Roosevelt focused primarily on what he saw as implausible outcomes to physical contests between animals, it is evident from London's response that he perceived the subtext of Roosevelt's objections to be an attack on his representation of canine consciousness, particularly his ascription of reason to his dog heroes.[31] In "The Other Animals," London defends himself from charges of anthropomorphism by implicitly distancing himself from sentimentalism and associating himself with realism, insisting, "The writing of these two books [*The Call of the Wild* and *White Fang*], on my part, was in truth a protest against the 'humanizing' of animals, of which it seemed to me several 'animal writers' had been profoundly guilty."[32] "Time and again," he writes, "in my narratives, I wrote, speaking of my dog heroes: 'He did not think these things; he merely did them,' etc. And I did this repeatedly, to the clogging of my narrative and in violation of my artistic canons; and I did it in order to hammer into the average human understanding that these dog-heroes of mine were not directed by abstract reasoning, but by instinct, sensation, and emotion, and by simple reasoning. Also, I endeavored to make my

stories in line with the facts of evolution; I hewed them to the mark set by scientific research, and awoke, one day, to find myself bundled neck and crop into the camp of the nature fakers" (OA, 199–200). It is not humanizing animals to attribute "simple reasoning" to them, London protests, but rather a logical extension of evolution that animals bound by common descent should exhibit similar physical and mental attributes. This point is central to *Descent*, where Darwin counters the claim that "man is separated through his mental faculties by an impassable barrier from all the lower animals" (49). Darwin notes that "the difference in mind between man and the higher animals, great as it is, is certainly one of degree and not of kind. We have seen that the senses and intuitions, the various emotions and faculties, such as love, memory, attention, curiosity, imitation, reason, &c., of which man boasts, may be found in an incipient, or even sometimes in a well-developed condition, in the lower animals" (ibid., 105). Echoing Darwin, London asks, "where [on the animal scale] is the impassable gulf?" (OA, 210).[33]

London defends his claims to realism with explicit references to evolutionary theory, dismissing Roosevelt as an "amateur" who "does not understand evolution," but reserving the bulk of his ire for Burroughs, "who claims to be a thoroughgoing evolutionist" (OA, 200–201). London scorns Burroughs for his "distinctly medieval" and "homocentric" assumption that "a vast gulf . . . divides man from the rest of his kin by virtue of the power of reason that he alone possesses. Man is a voluntary agent. Animals are automatons" (200, 202). This view, he suggests, can lead only to circular interpretations of animal behavior: "To do the unusual thing under unusual circumstances, [for the animal] successfully to adjust to a strange environment for which his heredity has not automatically fitted an adjustment, Mr. Burroughs says is impossible. He says it is impossible because it would be a non-instinctive act, and, as is well-known, animals act only through instinct" (202). London's criticism of Burroughs reflects not only his debt to Darwin, but also his intimate familiarity with the work of Romanes. In *Animal Intelligence* (1882), Romanes remarks that in "popular phraseology, descended from the Middle Ages, all the mental faculties of the animal are termed instinctive, in contradistinction to those of man, which are termed rational. But unless we commit ourselves to an obvious reasoning in a circle, we must avoid assuming that all actions of animals are instinctive, and then arguing that because they are instinctive, therefore they differ from the rational actions of man."[34] Besides objecting to the circularity of such reasoning, Romanes also takes issue with the practice of using a different standard to evaluate the behavioral evidence of mind in human beings from that used for all other animals: "The theory of animal automatism . . . , which is usually attributed to Descartes . . . can never be accepted by common sense; and even as philosophical speculation it will be seen . . . that by no feat of logic is it possible to make the theory apply to animals to the exclusion of man. The expression of fear or affection by a dog involves quite as distinctive and complex a series

of neuromuscular actions as does the expression of similar emotions by a human being; and therefore, if the evidence of corresponding mental states is held to be inadequate in the one case, it must in consistency be held similarly inadequate in the other."[35] Drawing on Romanes's arguments a second time, London writes: "When a dog exhibits choice, direction, control, and reason; when it is shown that certain mental processes in the dog's brain are precisely duplicated in the brain of man; and when Mr. Burroughs convincingly proves that every action of the dog is mechanical and automatic—then, by precisely the same argument, can it be proved that the similar actions of man are mechanical and automatic" (OA, 210).

The Rollo stories, anecdotes about London's boyhood dogs, constitute the central behavioral evidence of "The Other Animals." These vignettes allow London to dramatize a Darwinian approach to animal mind, using the observation and interpretation of behavior as a way of understanding the mental content of the animal subject. As is evident especially in *The Expression of the Emotions in Man and Animals*, Darwin views animals' behaviors and expressions as inherently communicative and meaningful.[36] Expression is a more reliable guide to internal states than language, Darwin suggests, even in human beings, because the "movements of expression reveal the thoughts and intentions of others more truly than do words, which may be falsified" (*Expression*, 364). "Expression," he writes, is the "language of the emotions" (366). The language of behavior is inherently meaningful because of its connection with animal mind, as Darwin explicitly notes in his private journals: "The whole argument of expression more than any other point of structure takes its value. from its connexion with mind, (to show hiatus in mind not saltus between man & Brutes) no one can doubt this connexion"; "this is very important as showing ‹connection› that expression mean SOMETHING."[37] Learning to understand this language is a matter of induction, as Darwin elucidates with a narrative about his own dog:

> I formerly possessed a large dog, who, like every other dog, was much pleased to go out walking. He showed his pleasure by trotting gravely before me with high steps, head much raised, moderately erected ears, and tail carried aloft but not stiffly. Not far from my house a path branches off to the right, leading to the hot-house, which I used often to visit for a few moments, to look at my experimental plants. This was always a great disappointment to the dog, as he did not know whether I should continue my walk; and the instantaneous and complete change of expression which came over him as soon as my body swerved in the least towards the path (and I sometimes tried this as an experiment) was laughable. His look of dejection was known to every member of the family, and was called his *hot-house face*. This consisted in the head drooping much, the whole body sinking a little and remaining motionless; the ears and tail falling suddenly down, but the tail was by no means wagged. With the falling of the ears and of his great chaps, the eyes became much changed in appearance, and I fancied that they looked less bright. His aspect was

> that of piteous, hopeless dejection; and it was, as I have said, laughable, as the cause was so slight. Every detail in his attitude was in complete opposition to his former joyful yet dignified bearing. (*Expression*, 57–60)

Context, repetition, experiment, careful observation, and familiarity all contributed to Darwin's interpretation of the *meaning* of the dog's posture: "dejection." What he discovered is not a behavioral paradigm to be taken as an end in itself, a mechanical correspondence between stimulus and response, but rather a complex of expressive gestures that embodies—and in doing so makes visible—a mental state.[38]

Like Darwin, London refuses to be cowed by the epistemological difficulties inherent in attempts to access animals' minds. As he explains in a 1903 letter, "We know little or nothing about what dogs think. But then we may conclude from their actions what their mental processes might be, and such conclusions may be within the range of possibility."[39] The Rollo stories recapitulate Darwin's inductive, experiential approach and are intended to refute the view with which London associates Burroughs, that an "animal is a mechanism that operates according to foreordained rules," compelled by heredity "automatically to respond in a fixed manner and a certain way to all the usual external stimuli it encounters in the course of a usual life" (OA, 202). Such a reductive, neo-Cartesian view had gained vigor with the influential 1894 proclamation of the British psychologist C. Lloyd Morgan that "in no case may we interpret an action as the exercise of a higher psychical faculty, if it can be interpreted as the outcome of one which stands lower on the psychological scale."[40] "Morgan's canon," as it came to be known, mandated that if the same behavior could be explained equally by invoking a "simple" faculty or a "complex" one, then the principle of parsimony dictated that the simpler explanation must prevail. Yet as Darwin and Romanes had already suggested, the simplest explanation in view of evolution is that related animals are likely to exhibit homologous traits not just physically but also psychologically, and that analogous mental states are likely to arise from analogous neurological traits.[41] In the Rollo stories, London's boyhood dogs respond appropriately in "unusual" situations for which heredity could never have prepared them. In doing so, they exhibit preference and agency and demonstrate their ability to learn from experience, to form expectations, and to make choices. The wolf-shepherd mix Glen, for instance, "infatuated" with riding in the car and having learned to associate the sound of its horn with an imminent departure, abandons his breakfast one morning upon hearing it, "the mush and milk dripping down his excited and happy chops," not because he "wanted his breakfast less," but because "he wanted his ride more" (OA, 205). In doing so, London writes, the dog "display[s] what is called the power of choice—a peculiarly lordly attribute that, according to Mr. Burroughs, belongs to man alone." When the horn is later sounded as a trick, Glen demon-

strates his ability to learn from experience, falling for it only once more before "he grew wise" and "stayed by his breakfast and finished it" (206). London's insistence on Glen's ability to learn and to exercise choice based on this new understanding differentiates his behavior from a mere mechanical responsiveness to stimuli and invokes Romanes's "criterion of mind," the presence of choice: "Thus once more did he display the power of choice, incidentally of control, for when that horn tooted it was all he could do to refrain from running for the barn" (ibid.).

The ethical implications of such an evolutionary understanding of the world were never far below the surface. Acknowledging the existence in nonhuman animals not only of emotions and the capacity for suffering, but also of reason and the ability to choose, necessarily raised new questions about their treatment that went beyond even those with which the humane movement was engaged. Since its inception, the distinction between voluntary agency and automatism had aligned ideologically with the concepts of reason and instinct, charging these concepts with much more than biological significance. The English biologist and advocate for Darwin's theory of evolution Thomas Henry Huxley began early on to identify the stakes of the conception of reality that would emerge from such debates: "I confess that, in view of the struggle for existence which goes on in the animal world, and of the frightful quantity of pain with which it must be accompanied, I should be glad if the probabilities were in favour of Descartes' hypothesis [that brutes are unconscious machines]; but, on the other hand, considering the terrible practical consequences to domestic animals which might ensue from any error on our part, it is as well to err on the right side, if we err at all, and deal with them as weaker brethren."[42] While the idea of the survival of the fittest, interpreted crudely, could be used in a Spencerian manner to justify the domination of the "inferior" by the "superior"—in this case of nonhuman animals by human beings—the notion of "common descent" also inevitably suggested that the special qualities thought to constitute this superiority might be widely present in other animals. Darwin had noted privately that an unwillingness to relinquish the right to subjugate other animals was behind the refusal to recognize fundamental similarities between human beings and other animals in their emotions and their mental phenomena: "Animals—whom we have made our slaves we do not like to consider our equals.—«Do not slave holders wish to make the black man the other kind?» Animals with affections, imitation, fear ‹of death›. pain. sorrow for the dead.—respect."[43]

Such implications were not lost on London, who at times embraced the ruthlessness of Social Darwinism but also absorbed this radically different lesson from Darwin. London's thinking along these lines took him beyond the focus on physical suffering characteristic of late nineteenth-century sentimental animal stories, which were disseminated explicitly to encourage the humane treatment of animals. If the presumed divide between human beings and other animals along a line sepa-

rating reason from instinct (on which the distinction between voluntary agency and automatism is made) does not hold, then perhaps it is not just physical suffering that is at issue in our treatment of other animals. London suggests that we do, indeed, inflict morally significant harm on animals when we deny them the opportunity to express their capacities for "direction, control, and reason," and, most important, "choice" (OA, 210). The question of canine choice and its relationship to the legal status of animals as property is central to both *The Call of the Wild* and *White Fang*, but before turning to these novels it will be helpful to examine the workings of this theme in one of London's lesser-known short stories, "Brown Wolf," which appeared in *Everybody's Magazine* in 1906 and was included in *Love of Life and Other Stories* in 1907.[44] "Brown Wolf" crystallizes London's thinking on the relationship between the capacity for choice and the property status of nonhuman animals and provides a lens through which to view the development of these ideas in his longer canine fiction.

Published after *The Call of the Wild* and during the serialization of *White Fang*, "Brown Wolf" deals centrally with the antithetical relationship between an animal's status as property and his capacity for choice. Brown Wolf is a wolf-dog (a rendition of London's own dog, also named Brown Wolf) who appears one day, hungry and exhausted, near the cottage of Walt and Madge Irvine (a thinly disguised Jack and Charmian London).[45] The couple takes great pains to win him over, but when the dog recuperates he yields to the "obsession that drove him north" (BW, 1076). After Walt rivets his name and address to a collar and places it on the dog, Brown Wolf is regularly returned by baggage car after routinely traveling hundreds of miles north, until, after a year of flight and recapture, the dog "accepted the inevitable and elected to remain at the cottage" (ibid.). The question of ownership arises when the Irvines by chance encounter Skiff Miller, a visitor from the Klondike who claims, to the distress of the Irvines, that the dog is his. Neither party views Brown Wolf precisely as property, but neither do they view him initially as a being with a right to choose. The Irvines seek to "win his love" and repeatedly grant him "his liberty" at the same time as they curtail his choices to the point that he finally "elect[s]" to stay (1075, 1076). Skiff Miller emphasizes the dog's value as the leader of his sled team—a dog for whom he had turned down offers of twelve hundred dollars—but emphasizes that he was "fair sick" when the dog was stolen "not" because of "the value of him," but because "I liked 'm like hell" (1083). To Madge's horror, Miller admits, "I nearly ate him once" (1081), but Miller also insists on his felt parental relation to the dog: "I was his wet-nurse. I put 'm to bed, snug every night. His mother died, and I brought 'm up on condensed milk at two dollars a can when I couldn't afford it in my own coffee. He never knew any mother but me. He used to suck my finger regular, the darn little cuss—that finger right there!" (1083).

Both parties treat Brown Wolf, though affectionately, as property, and the story's dilemma arises from their conflicting claims of ownership. While the conception of the dog as property serves also to protect the "owners" from the pain of the dog's choice to leave, the story's resolution ultimately hinges on the negation of those claims and the ability of the human beings to restrain their own feelings to allow and respect the dog's exercise of choice. Madge argues the point of property with Miller: "Maybe the dog has some choice in the matter. . . . Maybe he has his likes and desires. You have not considered him. You give him no choice. It has never entered your mind that possibly he might prefer California to Alaska. You consider only what you like. You do with him as you would with a sack of potatoes or a bale of hay" (BW, 1083). "This was a new way of looking at it," we are told—an accurate statement with respect to Skiff Miller and, no doubt, most of London's readers. Miller concedes that maybe Brown Wolf "has got a right to choose," and both parties agree to allow Brown Wolf to choose without trying to influence him (1084). Skiff Miller's slow retreat along the trail, while the Irvines silently remain sitting, results in several minutes for the dog of "painful indecision, not knowing his own mind, desiring both and unable to choose, uttering quick sharp whines and beginning to pant" (1085). This period passes, however, as Brown Wolf makes his choice: "Decision and deliberation marked his movements. He did not glance at the man and the woman. His eyes were fixed up the trail. He had made up his mind" (1086).[46]

London's representation of the moment of choice highlights the physical manifestations of the animal's mental activity. Behavior makes objectively visible Brown Wolf's subjectivity, expressing his conflicting desires and his ultimate resolution. The conclusion of "Brown Wolf" dramatizes Darwin's recognition of animals' reasoning power in that animals "may constantly be seen to pause, deliberate, and resolve" (*Descent*, 47) and the evidence of choice that is Romanes's "criterion of mind." London's human characters recognize that the dog's behaviors are as reliable as speech in conveying his desires, reflecting the view of Darwin and Romanes that expressive actions can reveal not just the fact of thought, but its content. As Darwin recognizes in *Expression*, these meanings can be so obvious, in cases of intimate familiarity, that we do not even realize how we have come to understand them: "Dogs, when a little impatient, often make a high piping note through their noses, which at once strikes us as plaintive; but how difficult it is to know whether the sound is essentially plaintive, or only appears so in this case, from our having learnt by experience what it means!" (88). Skiff Miller concedes that Brown Wolf cannot speak, saying, "He's got a head on him. He can do everything but talk," but it is apparent that, like Darwin, he views a dog's actions as essentially indistinguishable from language in their capacity to convey meaning: "Anyway, we'll leave it up to him. Whatever he says, goes" (BW, 1084). In "Brown Wolf," London the-

matizes the relationship between dog-as-chooser and dog-as-possession as one between expressive subject and object. Human self-restraint and silence open a space in which animal expression can be perceived because choice *is allowed* to occur.

The opposition between the property status of animals and animals' expression of subjectivity and choice similarly structures the narratives of *The Call of the Wild* and *White Fang*.[47] In *The Call of the Wild*, a large and powerful St. Bernard and Scotch shepherd mix named Buck is kidnapped from his home in the Santa Clara Valley of California, Judge Miller's place, over which "great demesne Buck ruled" (*CW*, 5), and sold to dog traders, who beat him into obedience before sending him north to the Klondike, where the gold rush is under way. Sold next as a sled dog to the Canadian mail carriers Francois and Perrault, Buck comes to understand the "Law of Club and Fang," witnessing the violent end of another dog to a pack of huskies and losing his allegiance to the rules of the south. During this period, Buck learns to survive the frozen north and gradually awakens to the instincts and ancient knowledge of his ancestors. After a fight to the death with his rival, Spitz, Buck assumes a leadership role at the head of the dog team, which passes into the hands of another mail carrier. He is then made to endure much heavier toil before the spent team is sold again, this time to a trio of inexperienced and foolish Americans. Hal, Charles, and Mercedes, newcomers to the north, overload the sled, run out of food, and have driven the starving dogs to exhaustion when by chance they encounter the prospector John Thornton on the trail. The just and kind Thornton intervenes, cutting Buck out of the traces when the dog, near death, resolves not to move again despite Hal's continued whipping and clubbing. Thornton thereby saves Buck from the fate of the Americans and the rest of the dog team, who all perish soon after when they fall through the thin ice of the trail. Buck's devotion to Thornton is challenged only by the stirrings that increasingly pull him toward the wild and his wolf brethren. Thornton's death in an Indian raid on the camp severs Buck's last tie to human civilization, and after killing several of the Yeehat Indians in revenge, Buck joins a wolf pack in the wilderness, becoming a legend among the Yeehats and mingling his breed with the wolves.

As this summary of the plot indicates, the role of choice in Buck's life is limited. Most of what happens to him occurs by no intention of his own but rather as a result of chance or the imposition of the will of others upon him. Yet the disjunction between Buck's capacity for choice and the situations forced upon him creates the conflict that drives the narrative. Buck is treated *as if* he were merely property, an object to be acted upon, but he is not.[48] The access that London's narrative offers into Buck's consciousness makes manifest the contrast between the dog's own view of things and the view that his human "owners" have of him—after he is kidnapped from Judge Miller's place and before his rescue by Thornton—as a possession. It is undeniable that Buck suffers physically (and he also inflicts much suffering), but the narrative frames the affronts to Buck's sense of self as vastly

more important than the dog's experience of physical pain. Buck's "royal" self-possession and "dignity that comes from good living and universal respect" convey a sense of entitlement that is insulted when he is betrayed, kidnapped, choked, and thrown into a crate (*CW*, 6). His emotional response to the violent treatment is not sorrow or self-pity but "wrath and wounded pride" (8). When Buck is sold again and set to work hauling the sled for Francois and Perrault, Buck's "dignity" is injured by his being forced to serve as a "draught animal"; he restrains his impulse to rebel not out of a sense of obedience but because he is "too wise" to do so (16). While suffering the abuse of the miserably incompetent Hal, Charles, and Mercedes, Buck and the other dogs are "angry" (not sad) at the "ill treatment they had received and the unjust load," and they do not suffer in silent martyrdom but avenge themselves by intentionally capsizing the sled (49). Consistently in these scenes, London emphasizes injustice over cruelty.[49]

Buck's assertion of will (or "exercise of choice," in Romanes's terms), despite the constrained circumstances in which he finds himself, takes the form of a cerebral rebellion that explicitly opposes the physical power brought to bear on him by human beings and other animals. Buck's rivalry with Spitz culminates in a confrontation over a hunted rabbit, during which Buck fights rationally, "by head," and emerges victorious while Spitz is destroyed by the waiting circle of dogs (*CW*, 35).[50] Afterward, Buck refuses to return to his old place in the traces, believing he deserves Spitz's old place of leadership: "After some time of this, Francois threw down the club, thinking that Buck feared a thrashing. But Buck was in open revolt. He wanted, not to escape the clubbing, but to have the leadership. It was his by right. He had earned it, and he would not be content with less" (38). Buck does not use force but simply avoids Francois and Perrault until they relinquish their clubs and concede that they are "beaten" (ibid.). Under the whip and club of Hal, Buck "ma[kes] up his mind not to get up" (56).

These instances of cerebral rebellion form a counterpoint to the relationship Buck has with Thornton, who is an "ideal master" because he attends to the care of his dogs not "from a sense of duty and business expediency" but "as if they were his own children, because he could not help it" (*CW*, 60). Paradoxically, it is in this situation, when Buck is treated as an autonomous being, as kin rather than as property, that his decisiveness appears to fail him. Having ended up in a valley where Thornton and his partners, Pete and Hans, spend all day panning for gold, and where the dogs have little to do but sit by the fire and reflect, Buck begins to feel the mysterious, instinctive "call" more strongly than ever. He comes alive to his senses, "wide-eyed and wide-eared to all that moved and sounded about him," pushing "his nose into the cool wood moss or into the black soil" and "snort[ing] with joy at the fat earth smells" (74). He begins regularly to wander off into the forest, hunting his own meat and running, "wildly glad," with the wolf whom he considers his "wood brother" (75–76). Buck stays away from camp for many days

at a time, but Thornton makes no effort at all to restrain him; watching Buck "marching out of camp," Thornton only comments admiringly, "Never was there such a dog" (78). Yet Buck is continually drawn back by his love for Thornton. This period of prolonged indecision allows Buck to be seen as a subjective being torn by conflicting desires rather than as an automaton driven mechanically, "according to foreordained rules" (OA, 202). Although Buck's desires are determined by his instincts, in the sense that his urge to answer "the call" is the result of "wild yearnings and stirrings for he knew not what" (*CW*, 74), and his urge to return to Thornton is motivated by love, a manifestation of what Darwin would call the "social instincts," it is not for lack of reason that Buck is unable to make the choice between Thornton and the wild; this is a choice for which reason offers no solution. It seems apparent that London was unwilling finally to settle Buck's choice between his beloved ideal master and the wild, with its "many-noted" call of the forest and its community of wolves, and for this reason he was impelled to invent the raid of the Yeehats to enact the death of Thornton, with which the "last tie was broken" (84). Although it is made simpler by the death of Thornton, Buck's answering of the call is still a choice, made on his own terms: "as never before, he was ready to obey" (ibid.).

The pattern that characterizes *The Call of the Wild*—the animal protagonist begins in a state of autonomy and freedom of choice, is robbed of that autonomy and choice, becoming property in the eyes of his masters, and then rediscovers it—is repeated in *White Fang*. After an opening scene in which two men traveling through the frozen north are trailed by a starving wolf pack that eventually kills all their sled dogs and one of the men, a gray cub, sired by a wolf, is born to the reddish-tinged wolf-dog who had lured the men's dogs away from the campfire. His littermates are soon dead from starvation, but the single surviving cub grows under the care of his mother, learning from experience and unconsciously forming generalizations until by chance he and his mother encounter an Indian village, where Gray Beaver recognizes the wolf-dog as his dead brother's dog, Kiche, and claims the cub, whom he names White Fang, for his own. White Fang feels his "heritage," the "freedom to roam and run and lie down at will . . . being infringed upon" (*WF*, 160), and his bondage is complete when Gray Beaver pays part of his debt to another Indian (who is, appropriately, traveling to the Great Slave Lake) with Kiche and beats White Fang into submission when he tries to follow his mother. After he accepts his allegiance to Gray Beaver, however, White Fang is sold to the cruel and unregenerate Beauty Smith, who forces him to fight dogs and other animals until he is rescued, on the verge of death, by the kind Weedon Scott, whom White Fang comes to love. White Fang accompanies Scott to his father's place in pastoral Sierra Vista, California, where he fathers a litter of puppies with the resident sheepdog, Collie, and becomes a hero when he kills a convict intruder seeking revenge against Judge Scott.

London's portrayal of canine choice in *White Fang* focuses less on his protagonist's progression toward autonomy and freedom from the "claims of man" (*CW*, 84) than on the voluntary nature of canine domestication and the mutual obligations it entails. Chance plays an overt role in White Fang's domestication, for the cub would almost certainly never have become domesticated were it not for the accident of his birth to a mother who had familiarity with human beings and the instance he witnesses of "the she-wolf, the fearless one, crouching down till her belly touched the ground, whimpering, wagging her tail, making peace signs" (*WF*, 157). It is also by mere chance that White Fang is able to find Gray Beaver's camp again after he has "quite deliberately . . . determined to stay behind" when the camp relocates (181). Although much of the effect of domestication is "insidiously, and by remote ways, as well as by the power of stick and stone and clout of hand . . . riveted upon him" (172), London stresses that "of his own choice," White Fang "came in to sit by man's fire and to be ruled by him" (182). The narrative does not conceal the fact that White Fang's domestication is in significant part a process of debasement and submission—one that "came hard, going as it did, counter to much that was strong and dominant in his own nature"—but it is also clear that his domestication is a voluntary transaction: "It was a placing of his destiny in another's hands, a shifting of the responsibilities of existence. This in itself was compensation, for it is always easier to lean upon another than to stand alone" (166).

London's characterization of domestication as a sacred covenant emphasizes the dual significance of agency and obligation in this mutual agreement. White Fang views the "man-animals" as gods because of their power to make rules and to enforce them with sticks and stones and other "dead things": "To his mind, this was power unusual, power inconceivable and beyond the natural, power that was godlike" (*WF*, 159–60). London's man-god motif evokes Darwin's discussion in *Descent* of the potential for religious-like feeling in nonhuman animals: Darwin recognizes "some distant approach to this state of mind" in the "deep love of a dog for his master, associated with complete submission, some fear, and perhaps other feelings" (68). "Professor Braubach," says Darwin, "goes so far as to maintain that a dog looks on his master as on a god" (ibid.). Despite the hierarchical notion of human beings as gods with respect to dogs, it is the human beings in *White Fang* who repeatedly abrogate the terms of the agreement and thereby show themselves to be morally inferior. The exchanges of White Fang as property between men are charged with the inescapably religious overtones of redemption and betrayal. Tricked into alcoholism, Gray Beaver finally agrees to sell White Fang to Beauty Smith in exchange for whiskey, but White Fang expresses his own intentions by chewing himself free and returning to Gray Beaver: "He owed no allegiance to this strange and terrible god. He had given himself to Gray Beaver, and to Gray Beaver he considered he still belonged" (*WF*, 213). White Fang belongs to Gray Beaver in

the sense of attachment, not as alienable property. He is aware that the men consider him to be property that has legitimately changed hands—he "had seen dogs change owners in the past, and he had seen the runaways beaten as he was being beaten" (214)—but he refuses to relinquish his fidelity to Gray Beaver, despite the fact that "Gray Beaver had betrayed and forsaken him" (ibid.).

The disparity between the way that White Fang conceives of the men (as individuals) and the way they conceive of him (as exchangeable property) heightens the injustice of White Fang's betrayal. White Fang enters into the "ancient covenant" with Gray Beaver in particular, not with human beings generally (*WF*, 190); he views Gray Beaver as "his own particular god" (214). As White Fang understands it, "For the possession of a flesh-and-blood god, he exchanged his own liberty. Food and fire, protection and companionship, were some of the things he received from the god. In return, he guarded the god's property, defended his body, worked for him, and obeyed him" (190). Gray Beaver violates the terms of the covenant, denying his duty to protect White Fang and "look[ing] on stolidly" as Beauty Smith whips White Fang: "He gave no protection. It was no longer his dog" (215). The shift in pronoun from "he" to "it" highlights White Fang's conversion from subject to object. In contrast, White Fang honors his duties to Gray Beaver, even that of obedience, disobeying only the one command of Gray Beaver (to shift his allegiance to another man) that denies the basis of the covenant itself.

The effect of the emphasis in *White Fang* on domestication as a mutual agreement is dual. While it can serve to legitimize the notion that domestication is a fair partnership, whatever its quality, that results in a life for nonhuman animals that is preferable to the life they would lead otherwise, it also insists on the agency of the nonhuman as well as human participants, reinforcing a notion of human obligation based not on paternalistic stewardship or pity but on equality and respect. It is apparently on the basis of the fact that the relationship between human beings and dogs so often takes the shape of a *mutual* interest, need, or love that London sees the case of canine domestication—"the call of the fire and of man—the call which it has been given alone of all animals to the wolf to answer, to the wolf and the wild dog, who are brothers" (*WF*, 169)—as unique. Yet, in its conception as a mutually beneficial alliance between choosing subjects, the relationship between human beings and dogs (though perhaps unique among relationships that human beings have with other animals) is entirely commonplace in the natural world, merely one example of many mutually beneficial social alliances that characterize relations between species. As Darwin notes, "Animals of many kinds are social; we find even distinct species living together, as with some American monkeys, and with united flocks of rooks, jackdaws, and starlings. Man shows the same feeling in his strong love for the dog, which the dog returns with interest" (*Descent*, 74).

The property-choice thematic conflict that pervades *The Call of the Wild* and *White Fang* is shaped by the narratives' complex relationship with the view of

human-animal relationships typical of sentimental animal fiction. Despite London's efforts to differentiate his dog novels from the sentimentalism with which critics had charged the wild animal stories of his contemporaries, there are striking generic similarities between London's narratives and the sentimental animal stories promoted by the humane movement. Charles Watson identifies the sentimental animal story, with its "warm-hearted celebration of the rewards of kindness to a dumb animal, often in contrast to the pathos of mistreatment at the hands of a cruel master," as one of the precursors of *The Call of the Wild*.[51] As Watson suggests, the text's episodic structure, its contrasts between cruel and kind masters, and its scenes of cruelty verging on "the animal-story variety of didactic pathos" reveal its kinship to classic anti-cruelty narratives like *Black Beauty*.[52] The same could easily be said of the episodic structure, contrasts between cruel and kind masters, and scenes of cruelty in *White Fang*. The main difference between these narratives and sentimental animal fiction, however, is London's recognition that animals not only feel pain but also have the capacity for autonomy and choice. This recognition shifts his emphasis from kindness to justice. Readers of London's stories are asked not to condescend to animals but, in light of the implications of Darwinian evolution, to feel outrage at their unjust treatment. In their emphasis on justice, London's dog narratives embody a shift in thinking about the moral treatment of animals from a paradigm based on sympathy to one based on rights.

Although the narratives of *The Call of the Wild* and *White Fang* travel in opposite directions thematically, one from human civilization to the wild, and the other from the wild to human civilization, both texts are concerned with the question of what justice for animals in these realms entails. Watson points out that each novel includes the rescue of the dog protagonist "by a kindly master, from whom he learns selfless love."[53] However, it is not just their rescue by a kindly master, but a more fundamental engagement with the notion of animals as property that is the fulcrum of both Buck's and White Fang's transformation. The dogs' rescuers are confronted with a moral dilemma: the conflict between a legal system that honors property rights, on one hand, and the felt immorality, in heightened instances of abuse, of the system of property rights in sentient beings, on the other. Both narratives explore the question of justice as it relates to the legal status of animals as property and the relationship of that status to animals' capacity for choice.

In *The Call of the Wild*, the differences between two characters, Mercedes and John Thornton, present a clear distinction between the ineffective sympathy that may be dismissed as sentimentalism and the effectiveness of sympathetic outrage. Unlike her husband, Charles, and her brother, Hal, Mercedes is initially sympathetic to the dogs, but her sympathy turns out to be uninformed and hollow. She implores Hal not to whip the "poor dears" when the team is unable to start the frozen, overloaded sled, but she understands the dogs no better than the men do. Unable to recognize the team's exhaustion, she kneels "before Buck, with tears in

her eyes" and "her arms around his neck," crying "why don't you pull hard?—then you wouldn't be whipped," an advance that Buck endures only because "he was feeling too miserable to resist her" (*CW*, 48). Mercedes is too self-interested to take the actions that would prove her sympathy sincere. When an onlooker tells Hal that the dogs need to rest, Mercedes "rushe[s] at once to the defence of her brother" and reassures him: "You're driving our dogs, and you do what you think best with them" (ibid.). She cries over their discarded possessions when the men are forced to lighten the load and then insists on riding the sled pulled by the exhausted animals. When the group encounters Thornton at his camp at White River and Hal again whips and clubs the dogs to start them on the thinning ice of the trail, Thornton feels sympathy where Mercedes no longer does. As Mercedes had cried, so "moisture [comes] into his eyes," but Thornton's sympathy proves to be different from hers (56). Thornton's sympathy is complemented with "rage," which "convulse[s]" him; this convulsive outrage is the force behind his intervention on Buck's behalf (57).[54]

The defining difference between Mercedes's and Thornton's sympathy is each one's relationship to the dogs' legal status as property. Mercedes's sympathy is ultimately subordinate to the notion of property ("you're driving our dogs, and you do what you think best with them"), whereas Thornton's supersedes it. Thornton's rage overwhelms his deference to the convention of property in sentient beings, and he cuts Buck out of the traces despite Hal's assertion of property rights: "It's my dog" (*CW*, 57). This move is something of a struggle even for the heroic Thornton, and he seems to overcome his respect for private property only when he casts off the conventions of his culture and acts *naturally*, for he watches the whipping and beating for some time with "compressed" lips before intervening with a "cry that was inarticulate and more like the cry of an animal" and a blow that carries the force of "a falling tree" (ibid.). The imagery that accompanies Thornton's intervention implies that he acts not from a position of civilized superiority but out of a sense of fundamental equality with Buck. Early in *The Call of the Wild*, we are told that in the southland, Buck "could have died for a moral consideration, say the defence of Judge Miller's riding-whip" (21). It is an ironic reprise that at this crucial moment, when Buck is on the verge of being whipped to death, he could quite literally have died for a moral consideration—the deference given to property rights—if Thornton had not finally burst forth from the hold of its conventions, which render legitimate almost any treatment of animals if it is endorsed or performed by an animal's owner.

The challenge to property rights in animals is seemingly more complicated for Weedon Scott in *White Fang* than for Thornton in *The Call of the Wild*, perhaps because Thornton is already in a liminal position on the fringes of his civilization, where its conventions have a less secure hold, whereas Scott is headed for the southland, the land of law and order, as embodied in his father, the judge. When

Scott first encounters White Fang, the wolf-dog is in the death grip of a bulldog and suffering a rain of kicks from Beauty Smith, who had set up the dogfight but is enraged at his imminent loss. Like Thornton in *The Call of the Wild*, Scott is overcome with "rage—a sane rage" (*WF*, 227) when he rescues White Fang from the dogfight ring. Yet rather than simply taking the dog outright, Scott offers the amount for which a mangled sled dog would sell and insists that Beauty Smith accept it. The violation of Beauty Smith's property rights occurs not by means of his not receiving appropriate exchange value for White Fang—although Smith does protest, "I ain't a-goin' to be robbed" (230)—but by means of his being forced to sell against his will. Yet when Scott insists that Beauty Smith take the money, he indicates that Smith's "brutal" treatment of the dog has fundamentally disqualified him from ownership. Scott says to Smith, "You've forfeited your rights to own that dog" (ibid.).[55]

The extremes to which both Thornton and Scott must be pushed before they will act in a manner that violates the property rights of the dogs' "owners" illustrate how deeply entrenched the notion of animals as property was in London's day (and remains in ours). Thus it is not surprising that these scenes of rescue in *The Call of the Wild* and *White Fang* at another level reflect the more conventional humane ethic of the sentimental animal story, where kindness has an economic resonance. Gary Francione terms as "legal welfarism" the legal doctrine whereby "the treatment accorded to animals under the law . . . is determined not by reference to any moral ideal but by the property status of the animal and by what conduct is perceived to maximize the value of animal property."[56] Accordingly, cruelty is measured "by the perceived legitimacy of the use to which the animals are put."[57] In *The Call of the Wild*, Thornton cuts Buck out of the traces in defiance of Hal's assertion of his property rights, but it is also clear that Hal, Charles, and Mercedes, who do not "know how to work dogs" or "to work themselves," are squandering their resources (*CW*, 51). This point is emphasized when the team departs and the sled promptly breaks through the thin ice, dragging the four remaining dogs and the irresponsible, ignorant human beings to their deaths. Hal, Charles, and Mercedes have "no businesslike method" and clearly do not know how to maximize the value of their animal property (46); through their ignorance and carelessness they have already managed to kill nine of their fourteen dogs by the time Thornton rescues Buck. In *White Fang*, the explicit monetary appraisal of White Fang, by which it is shown that the dog has lost half of his "worth" through the abuse he has suffered, conforms also to this conventional humane ethic (*WF*, 229). Beauty Smith subjects White Fang to a use—dogfighting—that has at best a borderline social legitimacy. It is a use that certainly does not maximize (rather, we are told, it "hal[ves]") his "worth" as "a good sled-dog" (ibid.).

If, under the logic of legal welfarism, human cruelty diminishes an animal's worth, then kindness increases it.[58] Buck not only saves Thornton in a bar-

room brawl (*CW*, 64) and from drowning (64–66), but he "earn[s] sixteen hundred dollars in five minutes for John Thornton" on a wager that he could start a thousand-pound sled (71). Similarly, White Fang summons the family when Scott is thrown from his horse, foils an attempt on Judge Scott's life, and also proves his worth monetarily by "work[ing] in the sled in the day" while "not forego[ing] the guarding of his master's property in the night" (*WF*, 246). In thus being "on duty all the time," we are told, White Fang becomes "the most valuable of all the dogs," prompting Matt to remark to Scott, "you was a wise guy all right when you paid the price you did for that dog. You clean swindled Beauty Smith on top of pushin' his face in with your fist" (ibid.).

The instrumental logic of legal welfarism coincides with sentimental plot expectations, where good actions are generally rewarded and bad ones punished. The incidentally discovered value of Buck and White Fang to their respective human beings conforms to these expectations. Because the kind treatment of animals maximizes their monetary worth, it is not surprising that in many instances in both *The Call of the Wild* and *White Fang*, love as a motive is indistinguishable from good business sense. Buck and the team are sold (ending up in the hands of Hal, Charles, and Mercedes) because of the need for a steady supply of fresh dogs to carry the mail: "The worthless ones were to be got rid of, and, since dogs count for little against dollars, they were to be sold" (*CW*, 46). It is apparently in opposition to this ruthless business logic that Thornton, who clearly loves Buck, refuses to cash in on Buck's worth when he rejects offers from a fellow prospector to buy Buck for eight hundred, a thousand, and then twelve hundred dollars, before and after the barroom wager in which Thornton bets that Buck can start a thousand-pound sled. With tears in his eyes, Thornton tells the prospector, "You can go to hell, sir" (70). Yet Thornton's response is overdetermined; his refusal to sell Buck might equally be justified by his recognition of the dog's value as capital. As in any love plot, Buck must prove his love for Thornton, but Buck literally *repays* Thornton's kindness by pulling the sled to "[earn] sixteen hundred dollars" (71). Thornton makes this equivalence clear when he whispers in Buck's ear just before Buck begins to pull: "As you love me, Buck" (69). Similarly, after White Fang's rescue, Weedon Scott sets "himself the task of redeeming White Fang—or rather, of redeeming mankind from the wrong it had done White Fang" (*WF*, 243). London's correction (it is not White Fang but "mankind" that needs to be redeemed) is consistent with the interpretation that redemption is not a financial venture but "a matter of principle and conscience," yet Scott does also restore White Fang's value as a sled dog (ibid.). When Weedon Scott puts the harness on White Fang, the dog understands "it as his master's will that Matt should drive him and work him just as he drove and worked his master's other dogs" (245).

The persistence of the logic of legal welfarism in *The Call of the Wild* and *White Fang* reveals a deeper kinship with the sentimental tradition than London would

likely have cared to admit. Whether his use of such sentimental constructions was unconscious or a calculated measure to ensure the popularity of his narratives, it demonstrates the tenacity of the idea that the value of animals is ultimately to be measured in currency, and the difficulty—in light of long-established social and legal norms—of conceiving of animals in any other way. It also reflects the practical approach evident in the sentimental animal narratives promoted by the humane movement, which often appealed to readers' financial self-interest as well as to their sympathy in their arguments for the improved treatment of animals.[59] Although London retains the conventional logic of legal welfarism in *The Call of the Wild* and *White Fang*, his more radical proposal—that the treatment of animals as property is fundamentally in conflict with their ability, and hence their right, to choose—functions as the primary force shaping his narratives. London's human protagonists, Thornton in *The Call of the Wild*, Scott in *White Fang*, and the Irvines and Miller in "Brown Wolf," are exemplary because they live by the idea that "maybe the dog has some choice in the matter" (BW, 1083). London's canine protagonists, when granted the opportunity, unfailingly exert their power of choice.

Foregrounding injustice over cruelty and rights over sympathy, London's narratives transcend the limitations of the sentimental animal story in their conception of animals' capacity for autonomy and choice. This transcendence is partly due to the different function of London's narratives (he was not writing didactic stories with the express purpose of changing people's behavior toward the animals under their direct care and control), but it is also due to London's choice of dogs and wolf-dogs as protagonists. Although the implications of London's insights are not limited to these animals, his fascination with the figure of the wolf-dog hybrid seems to stem from its position at the interface between the domesticated human world and the wild, and its ability to survive, and even to thrive, in either realm. This plasticity allows London to envision an autonomous life for his canine protagonists in the wild, a life to which human beings may be peripheral or even entirely absent, a life in which human valuations and means of control (whether entirely self-serving or reflecting paternalistic concern for the animal) are marginal or irrelevant.

The plasticity of his canine protagonists also allows London to thrust them into radically new environments, where they must learn to respond appropriately to situations for which heredity has not, or has only partly, prepared them. Presenting animals with novel situations, for London as for Darwin, makes manifest their capacity for reason. Darwin's discussion of animal reason in *Descent* centers on the responses of animals to novel situations—such as monkeys learning to open eggs without losing the contents, to handle knives without hurting themselves, and to check for live wasps in the paper-wrapped lumps of sugar they were given—although he soon impatiently concludes that it can only be prejudice that prevents people from recognizing the evidence around them: "Anyone who is not convinced

by such facts as these, and by what he may observe with his own dogs, that animals can reason, would not be convinced by anything that I could add" (*Descent*, 47).

Despite their contrasting directions, both *The Call of the Wild* and *White Fang* undermine the polarities of nature-culture and instinct-reason by depicting individual adaptation as a process of learning and acculturation. Thus not only does White Fang learn "with every mishap" and "adjust[] himself" (*WF*, 143), both as a cub in the wild and when he must later learn the rules of the southland at Judge Scott's place, but Buck also "learn[ed] by experience" to survive in the wild, as "instincts long dead became alive again" (*CW*, 22). Although Jonathan Auerbach has referred to the fact that Buck must learn to be wild as "the central paradox informing the narrative," Buck's learning to be wild is not paradoxical unless one assumes that learning plays no role in the lives of wild animals, an assumption that neither Darwin nor London would have accepted.[60] London's canine fiction takes up implications of evolution that are often overlooked. If naturalism, as Stuart P. Sherman famously claimed, reflected an animal theory of human conduct, London's dog stories reflected, if not a human theory of animal conduct, the realization that the forces driving nonhuman animal behaviors are not unlike those driving human behaviors and cannot be subsumed solely under the rubric of "instinct."[61] Even as he recognizes the workings of power in every interaction, London posits a shared subjectivity, mutual feeling, and fundamental equivalence between dogs and human beings. His writings contest the instrumental logic that sees animals as only means to human ends, suggesting that animals have the capacity for, and hence should have the right to, self-determination.[62] His insistence on animals' capacity for choice is a reflection of the comparative psychology of his contemporaries and the influence of evolutionary science's conception of an animal-human continuum; it presents an essential challenge to received notions about animals as living automata and asserts an ethical stance that requires a fundamentally different way of conceiving of and treating nonhuman animals.[63] London's dog narratives articulate the realization to which Darwin had come several decades earlier: "if we choose to let conjecture run wild then animals our fellow brethren in pain, disease death & suffering & famine; our slaves in the most laborious work, our companion in our amusements. they may partake, from our origin in one common ancestor we may be all netted together."[64]

NOTES

1. See, for instance, Lawrence I. Berkove, "Jack London and Evolution: From Spencer to Huxley," *American Literary Realism* 36 (2004): 243–55.

2. See Earle Labor and Jeanne Campbell Reesman, *Jack London* (New York: Twayne, 1994), 12; John Perry, *Jack London: An American Myth* (Chicago: Nelson Hall, 1981), 47; and Andrew Sinclair, *Jack: A Biography of Jack London* (New York: Harper and Row, 1977), 14.

3. Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction*, 2nd ed. (Cambridge: Cambridge University Press, 2000), xxiii.

4. See, for example, Perry D. Westbrook, *Free Will and Determinism in American Literature* (Plainsboro, N.J.: Associated University Presses, 1979), 137–41.

5. Bert Bender, *Evolution and "the Sex Problem": American Narratives during the Eclipse of Darwinism* (Kent, Ohio: Kent State University Press, 2004), 4, xii.

6. Charles Darwin, *On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life*, ed. J. W. Burrow (1859; rpt., London: Penguin, 1968), 136–37. Hereafter cited in the text as *Origin*.

7. Darwin wrote, "When . . . we come to the Arthropoda and Vertebrata, even to the lowest classes in these two great Sub-Kingdoms, sexual selection has effected much; and it deserves notice that we here find the intellectual faculties developed, but in two very distinct lines, to the highest standard, namely in the Hymenoptera (ants, bees, &c.) amongst the Arthropoda, and in the Mammalia, including man, amongst the Vertebrata." Charles Darwin, *The Descent of Man, and Selection in Relation to Sex*, ed. John Tyler Bonner and Robert M. May (1871; rpt., Princeton, N.J.: Princeton University Press, 1981), 396. Hereafter cited in the text as *Descent*.

8. Erika Milam notes that Wallace's view of a "divinely granted mind" resulted in his rejection of "sexual selection by female choice in animals, seeing it as an untenable evolutionary mechanism—animals did not possess the ability to reason, thus they could not choose." Milam, *Looking For a Few Good Males: Female Choice in Evolutionary Biology* (Baltimore, Md.: Johns Hopkins University Press, 2010), 19.

9. Aristotle, *Politics*, 1254; and Aquinas, *Summa Theologica*, ii(1).6, ii(2).95, both cited in Keith Thomas, *Man and the Natural World* (New York: Pantheon, 1983), 32; John Locke, *An Essay concerning Human Understanding* (1706; rpt., London: Penguin, 1997), 156. Locke suggested that rationality was intimately tied to moral agency, but that rationality was not necessarily tied to physical form: "For were there a monkey, or any other creature to be found, that had the use of reason, to such a degree, as to be able to understand general signs, and to deduce consequences about general ideas, he would no doubt be subject to law, and, in that sense, be a man, how much soever he differed in shape from others of that name" (*Human Understanding*, 459).

10. William Paley, *Natural Theology; or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature* (Boston: Lincoln and Edmands, 1829), 33, 172–82.

11. Darwin cites Wallace's remarks as they appeared on page 392 of the *Quarterly Review* in April 1869. These were later republished in Alfred R. Wallace, *Contributions to the Theory of Natural Selection* (New York: Macmillan, 1870).

12. Alfred Russel Wallace, "The Origin of Human Races and the Antiquity of Man Deduced from the Theory of 'Natural Selection,'" *Journal of the Anthropological Society of London* 2 (1864): clxvi.

13. Darwin writes in his Notebook M, "With respect to free will, seeing a puppy playing cannot doubt that they have free will, if so all animals, then an oyster has & a polype (& a plant in some senses, perhaps, though from not having pain or pleasure actions unavoidable & only to be changed by habits). now free will of oyster, one can fancy to be direct effect

of organization, by the capacities its senses give it of pain or pleasure, if so free will is to mind, what chance is to matter «M. Le Compte»—the free will (if so called) makes change in bodily organization of oyster. so may free will make change in man.—the real argument fixes on heredetary disposition & instincts—.—Put it so.—Probably some error in argument, should be grateful if it were pointed out.—My wish to improve my temper, what does it arise from but organization. that organization may have been affected by circumstances & education, & by choice which at that time organization gave me to will—Verily the faults of the fathers, corporeal & bodily are visited upon the children.—The above views would make a man a predestinarian of a new kind, because he would tend to be an atheist. Man thus believing, ‹yet› would more earnestly pray 'deliver us from temptation,' he would be most humble, he would strive ‹to do good› «to improve his organization» for his children's sake & for the effect of his example on others. # It may be doubted whether a man intentionally can wag his finger from real caprice. it is chance, which way it will be, but yet it is settled by reason" (Charles Darwin, *Charles Darwin's Notebooks, 1836–1844: Geology, Transmutation of Species, Metaphysical Enquiries*, ed. Paul H. Barrett et al. [Cambridge: Cambridge University Press, 1987], 536–37). Page references to Darwin's notebooks correspond to the pagination of the Barrett volume (not to Darwin's original pagination); the single angle brackets indicate Darwin's deletions, while the double angle brackets indicate his insertions.

14. Ibid.

15. J. S. Huxley, *Evolution, the Modern Synthesis* (London: Allen and Unwin, 1942). See Ernst Mayr, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Cambridge, Mass.: Belknap, 1982), 510–34, 566–70; and Peter J. Bowler, *The Eclipse of Darwinism: Anti-Darwinian Evolution Theories in the Decades around 1900* (Baltimore, Md.: Johns Hopkins University Press, 1983).

16. Milam, *Looking for a Few Good Males*, 2.

17. George J. Romanes, *Darwin, and After Darwin* (Chicago: Open Court, 1892), 379.

18. With the rise of logical positivism in philosophy and its spread to the study of animal behavior in the early twentieth century, references to mental phenomena were purged from behavioral accounts. According to Colin Allen and Marc Bekoff, "Another effect of positivism was that questions about consciousness and other aspects of mind came to be regarded as unscientific. The Darwin-Romanes approach to mental continuity virtually vanished from the scientific mainstream, because the new breed of psychologists regarded Darwinian hypotheses about animal mentality as completely untestable by empirical means" (Allen and Bekoff, *Species of Mind: The Philosophy and Biology of Cognitive Ethology* [Cambridge, Mass.: MIT Press, 1997], 27). Behaviorists began to describe animal behavior in strictly physical terms. This trend culminated in the 1950s and 1960s with the dominance of neo-Cartesian behaviorism. The work of Donald Griffin in the 1970s initiated a new school of behavioral thought called "cognitive ethology," which renewed the Darwinian emphasis on mind in accounts of animal behavior.

19. George J. Romanes, *Mental Evolution in Animals, with a Posthumous Essay on Instinct by Charles Darwin* (London: Kegan Paul, Trench, 1883), 18.

20. The "nature fakers" controversy is described in Peter J. Schmitt, *Back to Nature: The Arcadian Myth in Urban America* (New York: Oxford University Press, 1969), 45–55; Paul

Brooks, *Speaking for Nature: How Literary Naturalists from Henry Thoreau to Rachel Carson Have Shaped America* (Boston: Houghton Mifflin, 1980), 201–18; and Ralph H. Lutts, *The Nature Fakers: Wildlife, Science, Sentiment* (Golden, Colo.: Fulcrum, 1990). Many of the writings by parties to the controversy are reproduced in Ralph H. Lutts, ed., *The Wild Animal Story* (Philadelphia, Pa.: Temple University Press, 1998). My discussion of the controversy relies primarily on Lutts's account and on his edited collection of many of the original materials.

21. Lutts, *Nature Fakers*, 1–36.

22. George Angell, founder of the American Humane Education Society and the Massachusetts Society for the Prevention of Cruelty to Animals, recognized the kinship between Harriet Beecher Stowe's sentimental classic *Uncle Tom's Cabin* and Anna Sewell's *Black Beauty*. In his introduction to the first American edition of *Black Beauty*, Angell wrote, "For more than twenty years *this thought* has been upon my mind. *Somebody* must write a book which shall be as widely read as *'Uncle Tom's Cabin,' and shall have as widespread and powerful influence in abolishing cruelty to horses as 'Uncle Tom's Cabin' had on the abolition of human slavery*. Many times, by letter and by word of mouth, I have called the attention of American writers to this matter and asked them to undertake it. At last the book has come to me—not from America, but from England, where already over *ninety thousand copies have been sold*." "The 'Uncle Tom's Cabin' of the Horse" (1890), reprinted in George T. Angell, *Autobiographical Sketches and Personal Recollections* (Boston: American Humane Education Society, 1897), 94–95, emphases in original.

23. Lutts, *Nature Fakers*, 36–38.

24. Charles Atwood Kofoid, "Beasts, Birds, and Fishes," *Dial* 33 (1902): 240–42.

25. Ibid., 240.

26. Jack London to George P. Brett, Feb. 12, 1903, in *The Letters of Jack London*, ed. Earle Labor, Robert C. Leitz III, and I. Milo Shepard (Stanford, Calif.: Stanford University Press, 1988), 1:342–43.

27. George P. Brett to Jack London, Mar. 19, 1903, ibid., 1:358.

28. The science of comparative psychology was explicitly focused on animals' subjective experience. Margaret Washburn wrote, "We shall be interested in what animals do largely as it throws light upon what they feel. . . . We have wonderfully advanced, within the last twenty-five years, in knowledge as to how the world looks from the point of view of our brother animals." Washburn, *The Animal Mind: A Textbook of Comparative Psychology* (1908; rpt., New York: Macmillan, 1930), 23.

29. John Burroughs, "Real and Sham Natural History," *Atlantic Monthly* 91 (1903): 298–309, qtd. in *The Wild Animal Story*, ed. Ralph H. Lutts (Philadelphia, Pa.: Temple University Press, 1998), 129–43.

30. Burroughs, "Real and Sham Natural History," 132.

31. Throughout this essay, I refer to London's animal protagonists, for simplicity, as "dogs" (or as "canine") rather than as "wolves" (or "lupine") whether they are dogs or wolf-dog hybrids.

32. Jack London, "The Other Animals," *Collier's* 41 (1908): 10–11, 25–26, qtd. in Lutts, *Wild Animal Story*, 199–210. Hereafter this essay is cited in the text as OA. In a letter to the editor of *Collier's*, Theodore Roosevelt pointed out London's inaccuracies in his assessment

of the number of fights depicted between lynxes and wolves. Roosevelt also distanced himself from Burroughs's views on animal reason: "As a matter of fact, I believe that the higher mammals and birds have reasoning powers, which differ in degree rather than in kind from the lower reasoning powers of, for instance, the lower savages." Theodore Roosevelt to Mark Sullivan, Sept. 9, 1908, in *The Letters of Theodore Roosevelt*, ed. Elting E. Morison (Cambridge, Mass.: Harvard University Press, 1951–54), 6:1220–23.

33. London's conventional acceptance of the relationship between animals and human beings as a linear and hierarchical one, in which the gap between the two is closed with the ideological designation of "higher animal types" and "lower human types," is a formulation typical of Herbert Spencer but visible also in some of Darwin's writings. Spencer writes, "Generality is entirely a thing of degree; and unless it be asserted that the rational faculty of the cultivated European is essentially different from that of a savage or a child, it cannot consistently be asserted that there is any essential difference between brute reason and human reason." Herbert Spencer, *The Principles of Psychology*, 3rd ed. (New York: Appleton, 1880), 1:462.

34. Romanes, *Animal Intelligence* (London: Kegan Paul, Trench, 1882), 10.

35. Ibid., 6–7.

36. Charles Darwin, *The Expression of the Emotions in Man and Animals* (1872; rpt., Chicago: University of Chicago Press, 1965), hereafter cited in the text as *Expression*.

37. Darwin, *Charles Darwin's Notebooks*, 558, 553.

38. For a discussion of responses to Darwin's "anthropomorphic" style, see Eileen Crist, *Images of Animals: Anthropomorphism and Animal Mind* (Philadelphia, Pa.: Temple University Press, 1999), 11–50. Crist argues that "ordinary" and "technical" language creates "faithful" but "nonequivalent" representations of animal behavior that fundamentally affect how animals are conceived. The former "reflects a regard for animals acting as *subjects*," in that the "experiential perspective of animals is treated as real, recoverable, and invaluable in the understanding of their actions and lives," whereas the latter constitutes animals as "natural *objects*," or "through concepts that are extrinsic to their phenomenal world of experience" and "construes [animals' experiential perspective] as irrelevant to scientific knowledge about animal behavior." "Darwin's anthropomorphic language," she writes, "emanates from a commitment to evolutionary continuity that, for him, includes behavioral and mental continuity" (1–3, 49).

39. Jack London to Merle Maddern, Aug. 28, 1903, in Labor et al., *Letters of Jack London*, 1:381.

40. C. Lloyd Morgan, *An Introduction to Comparative Psychology* (London: Walter Scott, 1894).

41. See Bernard Rollin, "How the Animals Lost Their Minds: Animal Mentation and Scientific Ideology," in *Interpretation and Explanation in the Study of Animal Behavior*, ed. Marc Bekoff and Dale Jamieson (Boulder, Colo.: Westview, 1990), 1:375–93; and Roger Crisp, "Evolution and Psychological Unity," in *Readings in Animal Cognition*, ed. Marc Bekoff and Dale Jamieson (Cambridge, Mass.: MIT Press, 1996), 315. Frans de Waal argues along similar lines that there are two kinds of parsimony, "cognitive" and "evolutionary." "Cognitive parsimony is the traditional canon of American behaviorism that tells us not to invoke higher mental capacities if we can explain a phenomenon with lower ones. This

favors a simple explanation, such as conditioning of a response, over a more complex one, such as intentional deception. Evolutionary parsimony, on the other hand, considers shared phylogeny. It posits that if closely related species act the same, the underlying mental processes are probably the same, too. The alternative would be to assume the evolution of divergent processes for similar behavior, a wildly uneconomic assumption for organisms with only a few million years of separate evolution." Frans B. M. de Waal, foreword in *Anthropomorphism, Anecdotes, and Animals*, ed. Robert W. Mitchell, Nicholas S. Thompson, and H. Lyn Miles (Albany: State University of New York Press, 1997), xiv.

42. Thomas Henry Huxley, "On the Hypothesis That Animals Are Automata, and Its History" (1874), in Huxley, *Method and Results: Essays* (New York: Appleton, 1897), 199–250.

43. Darwin, *Charles Darwin's Notebooks*, 228.

44. Jack London, "Brown Wolf," *Everybody's Magazine* 15 (Aug. 1906): 147–56; and London, *Love of Life and Other Stories* (New York: Macmillan, 1907). Citations are to the reprinted version in *The Complete Short Stories of Jack London*, ed. Earle Labor, Robert C. Leitz III, and I. Milo Shepard (Stanford, Calif.: Stanford University Press, 1993), 2:1073–83, hereafter cited in the text as BW.

45. London wrote to his friend Cloudesley Johns: "I have won Brown. He has his liberty all the time now, & does not go to other house at all." London to Johns, Apr. 14, 1905, in Labor et al., *Letters of Jack London*, 1:476.

46. Characteristically for London's protagonists, Brown Wolf chooses the physical hardship and moral freedom of the northland over the comfortable but constrained life of the southland.

47. Jack London, *The Call of the Wild*, in *Jack London: Novels and Stories*, ed. Donald Pizer (1903; rpt., New York: Literary Classics of the United States, 1982), 1–86, hereafter cited in the text as CW; and Jack London, *White Fang*, ibid., 87–284, hereafter cited in the text as WF.

48. Jeanne Campbell Reesman has pointed out the structural and thematic similarities between *The Call of the Wild* and slave narratives. See Reesman, *Jack London's Racial Lives: A Critical Biography* (Athens: University of Georgia Press, 2009), 75–86. These similarities are less surprising when the most basic element of enslavement—the conversion of an autonomous subject into property—is recognized.

49. Kristin Boudreau discusses the effects of sympathetic appeals in the context of slavery, pointing out that sentimentalism "generates compassion on the part of readers by depicting those victims as passive, feeble, and pitiable," and suggesting that "the helpless, indeed the subhuman, object of pity is the necessary outcome of a political appeal based on sympathy for the suffering rather than on human entitlement." Boudreau, *Sympathy in American Literature: American Sentiments from Jefferson to the Jameses* (Gainesville: University Press of Florida, 2002), 97.

50. Marian Scholtmeijer sees London as somewhat disingenuous in his attempt to divorce his dog heroes from human standards of morality. She writes that the efforts of London, Seton, and Roberts to "supplant the Victorian neurosis over bloodshed among animals" in the hope of "undermin[ing] that anthropomorphism which allows wild animals to be assimilated by the tender sentiments of the reader" end by "rais[ing] a rival morality to the sentimental variety and show[ing] virtue residing in strength." Scholtmeijer, *Animal Victims*

in Modern Fiction (Toronto: University of Toronto Press, 1993), 100–101. London's attempt to distance himself from sentimentalism also has to do with issues of gender. Jonathan Auerbach argues that "delivering letters for London quickly came to serve as a severe test of his manhood, part of the larger naturalist project of his contemporaries such as Frank Norris and Stephen Crane to masculinize writing and enhance its status as a professional vocation by wresting it from a nineteenth-century feminine, sentimental literary tradition." Auerbach, *Male Call: Becoming Jack London* (Durham, N.C.: Duke University Press, 1996), 16.

51. Charles N. Watson Jr., *The Novels of Jack London: A Reappraisal* (Madison: University of Wisconsin Press, 1983), 36.

52. Ibid.

53. Ibid., 85.

54. London's effort to differentiate himself from female proponents of sympathy and the female-dominated humane movement is evident in his portrayal of Mercedes, whose feminine sympathy is shallow, uninformed, ineffective, and ultimately disingenuous. Whereas female advocates of sympathy relied primarily on moral suasion, London's characters use force to achieve humane objectives. On the gender makeup of the humane movement, see James Turner, *Reckoning with the Beast: Animals, Pain, and Humanity in the Victorian Mind* (Baltimore, Md.: Johns Hopkins University Press, 1980), 48–52, 93–95.

55. The suggestion here is that one's difference from, and superiority to, other animals (one's "humanity") is contingent on treating them kindly. London uses a conventional association of cruelty with bestial behavior to develop the connection between cruelty and the forfeiture of property rights. As Weedon Scott explains, "A man's got his rights. But you're not a man. You're a beast" (*WF*, 230). The message, of course, is that Beauty Smith has by means of his bestial behavior lost his "humanity," or membership in the group that can legitimately claim property rights in other living beings.

56. Gary Francione, *Animals, Property, and the Law* (Philadelphia, Pa.: Temple University Press, 1995), 27.

57. Ibid., 29.

58. The respect of the loving masters for their dogs also does not apparently preclude somewhat sadistic "experiment[s]" on the strength of the dogs' love or intelligence (*CW*, 63). Thornton demonstrates, for Hans and Pete, Buck's selfless devotion to him when, on a "thoughtless whim," he commands Buck to jump off a sheer cliff with a three-hundred-foot drop and has to "grappl[e] with Buck on the extreme edge" to keep him from going over (63). Similarly, Matt realizes that White Fang understands what it means when a rifle is pointed at him, and finds it "worth investigatin'" (*WF*, 236). "Watch," he tells Scott, and proceeds to step toward and away from the rifle to demonstrate the dog's reaction to it, ending by slowly raising the rifle to his shoulder to elicit White Fang's reaction, "just for fun" (ibid.). Of course it is a life-or-death situation for White Fang, and he knows it, but fortunately he manages to make his intelligence visible to the men, who by means of inductive reasoning arrive at their shared conclusion: "That dog's too intelligent to kill" (236–37).

59. For example, in Marshall Saunders's immensely popular *Beautiful Joe* (1894), the winner of a contest sponsored by the American Humane Education Society, kindness to animals not only obviates the social disorder and ramifying negative social effects of cruelty

but also leads to personal gain and general social improvement. Mrs. Wood tells Laura, "Even if I didn't want to be kind to my hens, it would pay me to be so for the sake of the profit they yield. . . . If you are going into the business for the purpose of making money, it pays to take care of them." Saunders, *Beautiful Joe* (n.p.: American Baptist Publication Society, 1894), 163.

60. Auerbach, *Male Call*, 91.

61. Stuart P. Sherman, "The Barbaric Naturalism of Mr. Dreiser," in his *On Contemporary Literature* (New York: Holt, 1917), 93–94.

62. An extended consideration of the relationship between London's attitude specifically toward dogs and his attitude toward other animals is beyond the scope of this essay. Clearly, dogs have a special place in London's life and imagination that is not matched by any other species. However, it is also clear that London's objection to cruelty and to the control imposed by human beings on animals goes well beyond his consideration for dogs. London wrote *Michael, Brother of Jerry* specifically to expose the "deliberate cruelty and torment that is manifest behind ninety-nine of every hundred trained-animal turns" and recommends that his readers "become members of, and ally themselves with, the local and national organizations of human societies and societies for the prevention of cruelty to animals." Jack London, *Michael, Brother of Jerry* (Paris: Nelson and Sons, 1915), vi–vii. Lisa Mighetto writes that the publicity brought to the issue by this book inspired the formation in 1918 of the Jack London Club, an animal welfare organization, which lasted throughout the 1920s and eventually attracted a membership of three hundred thousand. Public objection to animal acts led the Ringling Brothers, Barnum and Bailey Circus to eliminate their wild animal performances between 1925 and 1929 and led William T. Hornaday, the director of the New York Zoological Park, to defend zoos against the "sentimental Jacklondon [*sic*] idea" that animals in captivity are unhappy (Mighetto, *Wild Animals and American Environmental Ethics* [Tucson: University of Arizona Press, 1991], 68–69). London also spoke out against other forms of cruelty, such as bullfighting and the docking of horses. On the former, see London's story "The Madness of John Harned," in *The Night-Born; and also, The Madness of John Harned, When the World was Young, The Benefit of the Doubt, Winged Blackmail, Bunches of Knuckles, War, Under the Deck Awnings, To Kill a Man, The Mexican* (New York: Century, 1913), 33–62. On the latter, see London's letter on behalf of the English organization the National Equine Defence League. "Jack London and the Docking of Horses," June 10, 1913, Huntington Library, JLE 91, Jack London Collection, box 519.

63. This challenge to received notions about nonhuman animals (their mental and emotional lives and the rights they should be accorded) continues to build momentum. Currently available scientific research techniques, such as magnetic resonance imaging (MRI), are yielding new evidence of similarities between the internal states of human beings and those of other animals and are undermining traditional notions of animals as property. As Gregory Berns, a professor of neuroeconomics at Emory University, concludes from his own MRI research with unanesthetized, unrestrained canine subjects, "Dogs, and probably many other animals (especially our closest primate relatives), seem to have emotions just like us. And this means we must reconsider their treatment as property." Berns proposes the possibility of "a sort of limited personhood for animals that show neurobiological evidence of positive emotions." While acknowledging that recognition of the "personhood" of dogs

may not be imminent, Berns points out that neuroscientific evidence has been accepted as credible in recent Supreme Court decisions and suggests that "someday we may see a case arguing for a dog's rights based on brain-imaging findings." Gregory Berns, "Dogs Are People, Too," *New York Times* (Oct. 5, 2013), http://www.nytimes.com/2013/10/06/opinion/sunday/dogs-are-people-too.html (accessed Oct. 6, 2013).

64. Darwin, *Charles Darwin's Notebooks*, 228–29.

NICOLE M. MEROLA

T. C. Boyle's Neoevolutionary Queer Ecologies

Questioning Species in "Descent of Man" and "Dogology"

> I've always been writing about Charles Darwin and our relation to the environment.
> T. C. Boyle

Charles darwin's work on species, including his discussions of the origin of species, the mutability of organisms over geological time scales, the mechanisms of natural and sexual selection, the importance of an organism's relationship to its environment, physical and mental homologies across species boundaries, common descent, and the undirected nature of evolutionary processes, unfurl most famously in *On the Origin of Species* (1859), *The Descent of Man, and Selection in Relation to Sex* (1871), and *The Expression of the Emotions in Man and Animals* (1872).[1] In these and other texts, Darwin reconceives how we should think about the form, history, function, and context of organisms across the evolutionary spectrum. Darwin's observations and biological claims have ramifications for how humans conceptualize themselves and their relationships with the world. Or, as Michael T. Ghiselin puts it, "The species problem has to do with biology, but it is fundamentally a philosophical problem."[2] Taken together, *Origin*, *Descent*, and *Expression* promoted Darwin's revolutionary decentering of the human subject. This decentering inaugurated a biological and philosophical reordering of how we understand life, a reordering that continues to resonate in the twenty-first century.

Contemporary American author T. C. Boyle is one of our most astute interpreters of the way Charles Darwin's work impacts ideas about humanness. Boyle's interest in Darwin has been manifest from the beginning of his career, as the title of his first short story collection, *Descent of Man* (1979), makes clear. Stories from

that collection consider topics central to *Origin* and *Descent*: sexual selection, extinction, and competition for survival within a resource-limited environment.[3] *Tooth and Claw* (2005), Boyle's seventh short story collection, demonstrates his continued engagement with Darwin's work. The collection opens with an epigraph from chapter 6 of Darwin's *Descent*: "The Simiadae then branched off into two great stems, the New World and the Old World monkeys; and from the latter at a remote period, Man, the wonder and the glory of the universe, proceeded" (193). Many of the stories in *Tooth and Claw* satirize the notion that man is "the wonder and the glory of the universe," and the title of the collection indexes Boyle's interest in human and nonhuman wildness and in the kind of dispassionate environment Darwin describes as "cycling on" according to fixed natural laws.[4] However, despite traces of Darwin's work in *Descent of Man*, *Tooth and Claw*, and elsewhere in Boyle's oeuvre, the relationship of Boyle's writing to Darwin's remains untheorized.[5]

One of the key Darwinian analytic categories Boyle deploys in his writing is the concept of species, and in this essay I examine how Boyle engages with Darwinian and post-Darwinian ideas about species and species boundaries in the short stories "Descent of Man" (1977), which features cross-species sexual competition, and "Dogology" (2002), which probes the contours of cross-species hybridities.[6] Boyle investigates the idea of species in these texts through scripting interactions between human and nonhuman animals; such encounters abound in his work, and they are often included as a means for probing "our being animals in nature."[7] This remark indexes two related avenues of inquiry, both of which Boyle pursues. First, how do we think about humans as one among many animals *in* nature, that is, as organisms living in a shared environment? Second, of what does our animal nature consist, that is, what does it mean to have an animal nature and how is this related to our conceptions of human nature? These questions wonder about how species difference is constituted, where lines of difference are drawn or effaced, how these lines of difference are maintained or subverted, and who benefits from particular conceptions of species and species boundaries. These questions, and the ways Darwin and Boyle address them, mark both writers as participants in shifting how we understand species, animality, hybridity, fluidity, and relations among these concepts.

Darwin's work marks a critical turning point in a lengthy debate about the nature of organic species. As John S. Wilkins notes in *Defining Species: A Sourcebook from Antiquity to Today*, the term "species," a Latin translation of the Greek word *eidos* ("form"), has a long history with multiple classificatory applications.[8] Wilkins divides these applications into two modes: universal taxonomy and biological taxonomy. Universal taxonomy names a philosophical tradition "in which species are any distinguishable or naturally distinguished categories with an essence or definition" (*Defining*, 2), for instance Plato's use of *eidos* to denote a grouping of immaterial forms having the same essential qualities. In biological taxonomy,

material organisms are at issue. The consistent application of the term "species" to biological organisms gained traction in seventeenth-century practices of natural history (ibid., 3) and underwrote the eighteenth- and nineteenth-century biological taxonomies developed by Carl Linnaeus and others.[9] Darwin's writings nest within this lineage of biological taxonomy.

As do all taxonomic tools, the designation species includes and excludes, scripting relations of affinity and difference that order the world. In other words, different ways of thinking about species and species boundaries derive from and produce different epistemologies and ontologies, which in turn have different material consequences. In the introduction to *Zoontologies: The Question of the Animal*, Cary Wolfe defines discourses of species as the "constellation of signifiers [used] to structure how we address others of *whatever* sort (not just nonhuman animals)."[10] The commonplace usage of species discourse, he argues in *Animal Rites: American Culture, the Discourse of Species, and Posthumanist Theory*, has contributed to making "the *institution* of speciesism fundamental . . . to the formation of Western subjectivity and sociality."[11] That is, in Wolfe's account speciesism underwrites humanism, for both depend on "the tacit agreement that the full transcendence of the 'human' requires the [literal or figurative] sacrifice of the 'animal' and the animalistic" (*Rites*, 6). Speciesism, according to Wolfe, is instituted through "highly specific modes and practices of materialization in the social sphere" (ibid.), for instance laws and cultural norms. In speciesist discourse and practice the notion of species attaches to figurative and material exclusions. To mark some beings as other depends on promoting and reifying difference, on the elevation of some and the denigration and dehumanization of others. Or, to put it more bluntly, speciesism overlaps with racism, classism, sexism, and colonialism. In the United States, speciesism has been variously materialized, at different historical moments and in different ways, against those outside the normative U.S. subject position: human, male, white, heterosexual, able-bodied, citizen.[12]

GOING "THE WHOLE ORANG" WITH DARWIN: FROM SPECIES DIFFERENCE TO CROSS-SPECIES AFFINITY

Darwin inherited a particular set of speciesist legacies linked to humanism, Enlightenment thinking, and British colonialism. However, although his work may not have fully sloughed off these legacies, the arc from *Origin* to *Expression* represents a significant updating of species discourse, one that ultimately substitutes the theme of affinity (or goes "the whole orang") for the theme of difference.[13] Or, to put it another way, Darwin's work on species is less speciesist than the discourses of species he inherited and less speciesist than the ends toward which some have deployed his ideas.[14] I see Darwin's writing as inaugurating a turn away from a humanism based on the idea that humans have a stable species identity made

meaningful primarily through a contrast with nonhuman animality and toward a posthumanism that situates humans on the same plane as all other organisms.[15]

In *Origin* Darwin famously circumscribes his project, limiting himself to considering "the origin of species—that mystery of mysteries" (11). Narrowing his investigation allows Darwin to interrogate the difference between varieties and species and to highlight the mechanisms that produce "that perfection of structure and coadaptation which most justly excites our admiration" (13): competition and natural selection.[16] Darwin's arguments about descent with modification presume a Malthusian environment in which the trend toward overpopulation is constrained by environmental limits.[17] In the struggle for survival, some organisms prove better adapted to their environments than do others. The shaping and reshaping of organisms over time, which occur via the conjoining of competition and natural selection, are enabled because of variety, a point Darwin makes in chapter 2: "No one supposes that all the individuals of the same species are cast in the very same mould. These individual differences are highly important for us, as they afford materials for natural selection to accumulate" (50). For Darwin, the disinterested mechanism of natural selection vectors toward increasing difference. That is, varieties that exhibit great distinction from other varieties function as "steps leading to more strongly marked and more permanent varieties," as incipient species that may then lead "to sub-species, and to species" (55). In other words, "the lesser difference between varieties become[s] augmented into the greater difference between species" (106). Limiting himself to thinking about how speciation occurs in nonhuman organisms allows Darwin to sidestep the issue of where to situate humans in an impersonal world governed by the natural laws he delineates. Yet he does not altogether avoid the question of humans in *Origin*. Toward the end of chapter 14 Darwin cracks open the can of worms he will consider in *Descent* and *Expression*: "It may be asked how far I extend the doctrine of modification of species" (*Origin*, 421). He answers in two paragraphs that rely on analogy to build toward this statement: "probably all organic beings which have ever lived on this earth have descended from some one primordial form, into which life was first breathed" (422). During a brief discussion about how *Origin* might contribute to further research, he foreshadows the content of *Descent* and *Expression*, writing, "In the distant future I see open fields for far more important researches. . . . Light will be thrown on the origin of man and his history" (425).

The key trope in *Origin* is difference, but affinity is the key trope in both *Descent* and *Expression*, for in these companion texts Darwin undercuts notions of human exceptionalism by investigating numerous connections between humans and other animals. Darwin's trajectory toward affinity as the structuring framework for the latter two texts recasts his earlier work on difference, recontextualizing difference as something that nests within an overarching rubric of sameness. Working toward his sole objectives in *Descent*—to determine whether humans are descended from

an earlier form, how they developed into their present form, and how to think about racial difference (18)—Darwin employs methods of comparative anatomy and comparative anthropology. Comparative anatomy helps him to illuminate physical homologies between humans and other animals. Comparative anthropology offers evidence to discuss the development of intellectual and moral faculties across species and across human races.

In part 1 of *Descent* Darwin marshals evidence to support his argument for the descent of humans from a common ancestor. Returning to this claim at the end of *Descent* he bluntly summarizes his findings: "man is descended from a hairy, tailed quadruped, probably arboreal in its habits, and an inhabitant of the Old World" (678). Then Darwin pushes the evolutionary lineage of humans even further into the past, contending that "the early progenitor of all the Vertebrata must have been an aquatic animal . . . more like the larvae of the existing marine Ascidians [sea squirts] than any other known form" (679). Parts 2 and 3 of *Descent* showcase Darwin's work on sexual selection. Moving from lower animals, among them *Crustacea* (306–13), *Orthoptera* (325–33), and *Coleoptera* (337–51), to higher animals—birds and nonhuman mammals of many varieties (407–560, 561–619) and humans (621–75)—Darwin bolsters his claim that sexual selection, "the advantage which certain individuals have over others of the same sex and species solely in respect of reproduction" (243), is a crucial evolutionary mechanism that works with natural selection, which "depends on the success of both sexes, at all ages, in relation to the general conditions of life" (684). Darwin identifies two types of "sexual struggle": "in the one it is between the individuals of the same sex, generally males, in order to drive away or kill their rivals, the females remaining passive; whilst in the other, the struggle is likewise between the individuals of the same sex, in order to excite or charm those of the opposite sex, generally the females, which no longer remain passive, but select the agreeable partners" (ibid.).[18] Darwin's theory of sexual selection encompasses all organisms that "have their sexes separated" (241) and possess differing secondary sexual characteristics.

His inclusivity with respect to sexual struggle repeats in his considerations of racial difference in humans, which appear in the final chapters of parts 1 and 3. In the introduction to *Descent* Darwin identifies the importance of exploring the link between sexual selection and the differentiation of human races (19). Working against the prevailing belief in polygenesis, the idea that human races are different species, Darwin argues for monogenesis, the idea that all humans belong to the same species (194–240). Although in his discussions of modern racial difference he draws distinctions between "civilized" and "barbarian" races, he also repeatedly remarks on how, while "the existing races of man differ in many respects" (207), all modern humans possess fundamental traits "of character that [show] how similar their minds [are] to ours" (ibid.). In other words, Darwin argues for a fundamental affinity of humans across all races.

From the discussion of similarities in physical and mental structures and in modes of "sexual struggle" in *Descent*, Darwin moves in *Expression* to consider what the continuities in involuntary physical expressions across species boundaries might reveal about the origins of humans' higher faculties. To make the case that there exists a "community of certain expressions in distinct though allied species, as in the movements of the same facial muscles during laughter by man and by various monkeys" (*Expression*, 23), Darwin focuses primarily on involuntary expressions in domestic animals, captive primates, and humans, using the same method of detailed observation regardless of the organism under discussion. His description of snarling in chapter 10 is representative: "the uncovering of the canine tooth is the result of a double movement. The angle or corner of the mouth is drawn a little backwards, and at the same time a muscle which runs parallel to and near the nose draws up the outer part of the upper lip and exposes the canine on this side of the face" (227). Without knowing that this chapter details expressions of hatred and anger in humans, the reader might assume the comments pertain to dogs, and in fact the description of human snarling echoes closely the verbal description and visual illustration of a dog "on the point of springing on his antagonist" (112).[19] Darwin's consistent descriptive style in *Expression*, applied without prejudice to domestic animals, captive primates, and humans, anthropomorphizes its nonhuman subjects and objectifies its human subjects in order to bring human and nonhuman animals closer to each other, in order to make clear the affinities of physical structure and expression that exist across species boundaries.[20]

POST-DARWINIAN NEOEVOLUTIONARY QUEER ECOLOGIES

While Darwin begins in *Origin* by highlighting difference as the key framework for species, he moves in *Descent* and *Expression* to subsume species difference within a larger, all-encompassing structure that privileges common descent and cross-species affinities, both physical and mental. From a twenty-first-century perspective, this positing of radical affinities that overlie species boundaries positions Darwin's writing as inaugural to the shift away from a humanism focused on the importance of a concretely bounded and stable form of human being and toward a posthumanism that privileges mutability, relationality, and boundary blurring and that situates the human as unexceptional. Given Darwin's dismantling of human claims to exceptionalism, Elizabeth Grosz suggests in *Becoming Undone: Darwinian Reflections on Life, Politics, and Art* that humanities scholars should pursue research programs that explicitly acknowledge their post-Darwin context. "In Darwin's wake," she argues, we should explore the following questions: "What is the trajectory of a newly considered humanities, one that seeks to know itself not in opposition to its others, the 'others' of the human, but in continuity with them?"

"What kind of intellectual revolution would be required to make man, and the various forms of man, one among many living things . . . rather than the aim and destination of all knowledge?" (*Becoming*, 13–14).[21]

Scholars such as Noreen Giffney, Donna Haraway, Myra Hird, Lynn Margulis, and others who do biological and philosophical work that foregrounds what I'm calling neoevolutionary queer ecologies are already taking up questions akin to those Grosz poses. To this list I would add T. C. Boyle, for his stories "Descent of Man" and "Dogology" iterate the post-Darwinian, posthumanist attitude for which Grosz calls. The neologism "neoevolutionary queer ecologies" has multiple registers. Neoevolution (a word I borrow from Gilles Deleuze and Félix Guattari) suggests both a temporal component—work on evolution after Darwin—and a conceptual one: work that takes Darwin's ideas and remakes them. The phrase "queer ecology" encompasses a wide range of scholarship. Under this rubric one might, for instance, investigate same-sex behaviors of human and nonhuman animals, analyze the intertwining of queer desire and environment in literary or visual texts, examine the ways environmental and sexual discourses contribute to spatial practices, use biological sciences to challenge conceptions of human subjectivity or to denaturalize heteronormativity, or broaden the connotation of queer to include cross-species entanglements of all sorts, sexual and nonsexual.[22]

Although neoevolutionary queer ecology encompasses myriad research areas, for the purposes of this essay I position elements from Sigmund Freud's work on human sexuality and organic repression and from Gilles Deleuze and Félix Guattari's work on molecularizing the organism as the operative levers for considering Boyle's engagement with species in "Descent of Man" and "Dogology." Briefly, the material I pull from Freud concerns his theorization of polymorphous infantile sexuality, in which any object can serve as a "proper" libidinal attachment, and his discussion of the tenuous nature of organic repression, the repression of animality that secures humans as "civilized."[23] What makes Freud neoevolutionary is the way he imports aspects of Darwin's biological arguments into his theories of the sexual, psychological, and social development of humans. What makes Freud's neoevolutionism read as a form of queer ecology are his arguments that human sexuality is initially polymorphous and that human attempts to repress animal natures are only ever temporarily successful. In other words, as for Darwin, for Freud humans are always confronted by their animal pasts (and presents).

From the work of Deleuze and Guattari I am interested in the philosophy of promiscuous bodies and cross-species affiliation they advance in *A Thousand Plateaus: Capitalism and Schizophrenia*.[24] In *Plateaus* Deleuze and Guattari argue that we should understand bodies—a term that applies equally to animal, vegetable, mineral, and machine—not as organisms but rather as assemblages of parts that combine, and can differently recombine, for durations as short as a millisecond or as long as an eon. In their discussion of bodies Deleuze and Guat-

tari are not interested in identity and being, but rather in behavior and becoming; they privilege what a body can *do* rather than what it *is*. For instance, following Deleuze and Guattari we should understand a human body as an assemblage of brain, skin, bone, muscle, digestive organs, and sexual organs—all of which are themselves assemblages of other parts—that can cohere for a period of roughly a century. Although not all human bodies are similarly abled, many are capable of walking, thinking, eating, having sex, and engaging with other bodies, human and nonhuman. To extend this example, a human being out for a walk in a city park with her dog would be characterized by Deleuze and Guattari as a human-leash-collar-dog-park-locomotion machine.[25]

To carve a separation between the common understanding of organisms as stable, discrete entities and their notion of bodies as collections of parts in changeable relationship to their own parts and the parts of other bodies, Deleuze and Guattari develop a particular lexicon. They apply the term "molar" to designate the organism as commonly understood and the term "molecular" to their new way of thinking about bodies. Furthermore, they regularly interchange the words "machine," "assemblage," and "body." In addition to their focus on what bodies can do, Deleuze and Guattari also characterize bodies cartographically, in terms of their location (*Plateaus*, 260–61), and durationally, highlighting both how long they last as assemblages and the varying speeds at which their behaviors can take place. Cartography and speed are important for Deleuze and Guattari since bodies intersect and engage with those proximal to them and with those that move at similar speeds. The mutability of bodies, their functions, and their interactions with other bodies underwrites Deleuze and Guattari's formulation of becoming, or becoming-other.

The emphasis Deleuze and Guattari place on location aligns with the importance that environment has in Darwinian evolutionary theory.[26] However, Deleuze and Guattari explicitly differentiate their neoevolutionary philosophy from Darwinian "evolutionism," which, they note, "define[s] itself in terms of genealogy, kinship, descent and filiation" (*Plateaus*, 234). In place of the kinship relations privileged in Darwin, a filial lineage passed down along a line of descent of related material forms, Deleuze and Guattari offer the model of alliance across heterogeneous material forms; the pack replaces the family (239). They acknowledge that pack and family might seem like related terms: "Does a band [or pack] not imply filiation, bringing us back to the [Darwinian] reproduction of given characteristics? How can we conceive of a peopling, a propagation, a becoming that is without filiation or hereditary production? A multiplicity without the unity of an ancestor?" (241). To distinguish the Deleuzo-Guattarian pack from the Darwinian family, they "oppose epidemic to filiation, contagion to heredity, peopling by contagion to sexual reproduction, sexual production" (ibid.). And while they admit that the "themes" of "propagation by epidemic, by contagion" and "filiation by he-

redity" "intermingle and require each other" (ibid.), they highlight a fundamental distinction between the two themes. Using the example of the truffle, composed from tree, fly, and pig, they note that packs constellate "terms that are entirely heterogeneous" combined in ways "neither genetic nor structural" (242). In other words, for Darwin, truffle, tree, fly, and pig would register as four separate things, but for Deleuze and Guattari tree-fly-pig is a pack with the name truffle. In a nod to the queerness of their ecology, packs, which for Deleuze and Guattari can refer to either a singular or a group, are also positively described as "interkingdoms, unnatural participations" (ibid.). In place of Darwin's geologically lengthy, serial, and progressive account of speciation, they offer the concept of becoming-other, a process of assembling and reassembling bodies, parts of bodies, and behaviors that can take place on many different time scales and across radically different bodies, and that has nothing to do with the "fitness" of organisms. Deleuzo-Guattarian becoming-other offers a way of thinking and materializing bodily and behavioral difference that can be involuntary or chosen; this emphasis on the agency of the body distinguishes becoming-other from the inheritance of difference that underwrites Darwin's account of speciation.

Becoming-animal, the type of becoming-other most salient for my investigation of Boyle, is Deleuze and Guattari's most well-known formulation of becoming-other. In "1730: Becoming-Intense, Becoming-Animal, Becoming-Imperceptible . . . ," the tenth chapter of *Plateaus*, they explain that becoming-animal does not entail imitating another animal, or identifying or corresponding with or turning into another animal (239, 272). Rather, becoming-animal involves beginning "from the forms one has" (272) and establishing "the relations of movement and rest, speed and slowness that are closest to what one is becoming" (273). For example: "Do not imitate a dog, but make your organism enter into composition with *something else* in such a way that the particles emitted from the aggregate thus composed will be canine as a function of the relation of movement and rest. . . . this something else can be quite varied, and be more or less directly related to the animal in question: it can be the animal's natural food (dirt and worm), or its exterior relations with other animals (you can become-dog with cats, or become-monkey with a horse), or an apparatus or prosthesis to which a person subjects an animal (muzzle and reindeer, etc.)" (274). For Deleuze and Guattari, being a "real" animal, human or nonhuman, means "being trapped in its molar form and subjectivity" (275). Becoming-animal, on the other hand, entails "the production of the molecular animal" (ibid.). The difference between molar being and molecular becoming is encapsulated in this example: "A dog may exercise its jaw on iron, but when it does it is using its jaw as a molar organ." However, a man who eats iron is "totally different: he makes his jaw enter into composition with the iron in such a way that he himself becomes the jaw of a molecular dog" (274). The importance of molecular becomings-other for humans, according to Deleuze and Guattari, is the way they

resituate the body. Whereas molar being is constructed and constrained by governmental, religious, familial, scientific, philosophical, reproductive, and cultural ideologies, molecular becomings-other carve new cartographies and new assemblages illegible within the norm. This reconceptualization of bodies and their relations to their parts and to other bodies comprises a queer ecology.[27]

Drawing on Darwinian ideas about species and materializing aspects of Freudian and Deleuzo-Guattarian responses to them, Boyle scripts his own neoevolutionary queer ecologies in "Descent of Man" and "Dogology" in order to critique conventional American domesticity. Both stories feature love triangles, the interaction of female scientists with nonhuman animals, clueless human males, themes of domestic entrapment, and Boyle's trademark sly, dark humor. As part of his interrogation of late twentieth- and early twenty-first-century American domesticity, Boyle chooses different, though related, focal points and targets in each story. In "Descent" he probes Darwin's theories of sexual selection and reproductive hybrids, investigates his arguments about the physical and intellectual homologies between humans and other primates, and deploys Freud's theories of organic repression in order to expose and satirize the speciesist notion of human exceptionalism and to recast human sexuality as primate sexuality. In "Dogology" he foregrounds nonreproductive human-canine hybridity, utilizing a neoevolutionary queer ecology approach that derives from the same cultural climate that produces Deleuze and Guattari's molecularization of the organism. Boyle does so in order to draw parallels between British colonialism and American heterosexual marriage, to cast both as institutions detrimental to flourishing, to celebrate becoming-animal, and ultimately to argue that the pack offers a better configuration than the family.

"'We are conducting a series of experiments here'": organic repression and cross-species sexual selection in "descent of man"

"Descent of Man," the title story from Boyle's first collection, satirizes the ways humans attempt to disavow their animal nature, thus highlighting human anxieties about species boundaries. "Descent" features primatologist Jane Good, who, over the course of the story, transfers her affections from her human boyfriend, Mr. Horne, to Konrad, a literate chimpanzee with whom she works at the Primate Center.[28] A primary vehicle for Boyle's satire is the mechanism of reversal. While Jane departs from human conventions of hygiene and behavior to become more "animal," Konrad embodies the intellectual achievements associated with human genius: he responds to and translates English, French, German, and Chinese; enjoys opera; and sips brandy after dinner. Boyle's use of reversal highlights the fundamental anatomical and emotional structures common to all primates, and at this level the text engages in the same project of articulating affinity between

species as Darwin does. The story also, however, dramatizes anxieties about species boundaries, explicit in many responses to Darwin's work and explored in Freud's work, deploying the figure of Horne to explore human disquiet regarding our affinities with other animals.

"Descent of Man" begins with the line "I was living with a woman who suddenly began to stink" (3), an opening salvo that broadcasts a concern with human identity and behavioral norms. Within the space of the story's first two paragraphs we see Horne completely undone by Jane's "bestial and fetid" smell. It makes his eyes water and causes him to imagine "dark rotting trunks of the rain forest, stained sienna and mandalay and Hooker's green with the excrements dropped from above" (4). It also makes him vomit, "the sweetness of [his] own intestinal secrets a balm against the potent hairy stench of her" (ibid.). Although Horne cannot articulate the reason for his recoiling from Jane's smell, reading this episode through Freud's *Civilization and Its Discontents*, a text infused with evolutionary language and ideas borrowed from Darwin, illuminates its central pivot, the abjection of Horne's animal nature.[29]

In *Civilization and Its Discontents* Freud maps the operation of repression necessary for becoming civilized. For Freud, civilization rests on the twinned logics of separation and discipline. The process of civilizing begins when the ego recognizes a difference between itself and the external world and learns to control the desire to incessantly give in to the pleasure principle, to the satisfaction of instinctual desire.[30] Progression from infant to adolescent to adult, according to Freud, demands repeated scenes of discipline that reinforce will over instinct and that channel polymorphous infantile sexuality into its proper, same-species heterosexual attachments. Especially salient for the beginning of Boyle's "Descent" are Freud's comments about the role cleanliness plays in the civilizing process. In his discussion of the characteristics of civilized humans, Freud emphasizes the importance of hygiene: "Dirtiness of any kind seems to us incompatible with civilization. We extend our demand for cleanliness to the human body too" (*Civilization*, 40). Jane flagrantly dismisses this key tenet of civilized society, purposely failing to conform to a normal level of personal hygiene. In addition to indexing her growing disregard for human social norms, Jane's smell, caused in part by lack of bathing and in part by bits of rotting fruit stuck in "the long wild hanks of her hair" ("Descent," 3), also marks her entry into another set of social norms, those of the primates she studies.

Horne's response to Jane's aroma functions on two levels. On one level, he is conscious of his reason for vomiting; his trip to the bathroom represents an understandable bodily reaction to an unpleasant olfactory stimulus. On another level, however, the vomit issues from the unconscious realms, operating as a physical manifestation of the processes, and potential failures, of organic repression, Freud's term for forms of training and discipline (personal and societal) by which humans

sublimate and subjugate their animal natures. In a passage that echoes Darwin, Freud fleshes out his definition of organic repression by discussing how, as humans evolved into a bipedal species, their olfactory senses were devalued in favor of their visual senses.[31] However, where Darwin was interested in bridging and closing the distance between humans and other animals in *Descent* and *Expression*, Freud's discussion of organic repression entrenches the dichotomy between wild and civilized, animal and human. Man comes into his human form by raising himself from ambulating on four limbs, a move that, according to Freud, further distances man from other animals because his visible genitals engender feelings of shame.[32]

While organic repression attempts to widen and concretize the distance between human and animal, it also requires constant vigilance and maintenance because, as Freud suggests, "in mental life nothing which has somehow formed can perish . . . everything is somehow preserved and . . . in suitable circumstances . . . it can once more be brought to light" (*Civilization*, 16). In other words, organic repression is always on the verge of disintegration. Just as Freud's discussion of humans' evolution into bipedal ambulation draws on Darwin, so too does his discussion of the development of mental life, which employs the notion of mental vestiges, an echo of Darwin's work on physical vestiges (*Descent*, 28–43). It is the fundamental tenuousness of organic repression that is on display in the opening pages of "Descent." Horne's vomiting represents the action of his unconscious as it tries to expel the abject knowledge that organic repression could, at any moment, fail and reveal his fundamentally animal nature.

Horne's attempts to tamp down his horror at the inchoate realization of his animality by self-medicating with sleeping pills and alcohol fail, and his anxiety is augmented by his inferiority in the arena of sexual competition. The study of sexual competition, selection in relation to sex, occupies roughly two-thirds of *Descent*, and tracking sexual behavior across a broad range of species, from mollusks to humans, enables Darwin to map behavioral analogies between different groups. In his work on sexual selection in nonhuman mammals, Darwin proposes that males display various secondary sexual characteristics for females, who then select the mate they find most attractive.[33] Depending on the species, characteristics that would broadcast a male's fitness to a female might include success in battling other males, "greater size, strength, and pugnacity," "powerful odours emitted by the males during the breeding season," and ornamental "crests, tufts, and mantles of hair" (*Descent*, 618). He sees sexual differences and behaviors in humans as recapitulating those found in nonhuman mammals: human males are taller, heavier, stronger, and hairier, on average, than human females (621). Darwin makes one important distinction between sexual selection in other mammals and sexual selection in humans. In some cases, he notes, human females are on display for male choice. These instances of female display, however, are the exception to Darwin's general rules about sexual selection.[34]

In "Descent" Boyle utilizes, builds on, and extends Darwin's theories of sexual selection. Unlike Darwin, whose discussions about sexual selection are intraspecies, Boyle has no qualms about migrating the discussion of sexual selection across species boundaries. Furthermore, Boyle emphasizes the agency involved in Jane's choice of Konrad over Horne, implicitly chiding Darwin for his general tendency to foreground male display and background female choice while also refracting the existence of 1970s U.S. feminisms. As the above quotes from *Descent* indicate, size matters in sexual competition, an idea Boyle stages in the restroom scene where Horne first encounters Konrad. At the Primate Center, where Horne has gone to fetch Jane after work, he positions himself in front of a urinal. A chimpanzee "dressed in shorts, shirt and bow tie" wanders in, "open[s] his fly and pull[s] out an enormous slick red organ like a peeled banana" ("Descent," 5). In his embarrassment Horne looks away, but the sight of Konrad's organ and the sound of his urination staunch Horne's excretory function: his "water wouldn't come" and he "began to feel foolish" (ibid.). This emasculating incident takes place relatively early in the story, before the reader knows the full extent of Jane's involvement with Konrad and before the reader is introduced to Konrad's other, intellectual charms. It also throws into relief other moments when differences in size are noted. Each mention of relative size further emasculates Horne and positions Konrad as the physically superior male.[35] This superiority proves to be a key aspect of his attractiveness to Jane.

Though Darwin begins *Descent* by discussing physical and structural homologies between humans and other animals, he moves quickly into examining the development of mental powers and moral sense, reminding us that size and other physical attributes are not the only characteristics at play in sexual selection (85–172, 621–75, 679–80). Especially for the higher animals, Darwin argues, intellect, facility at communication, and the powers of reason and imagination also become factors. He contends that reason and imagination have been selected for via natural and sexual selection (630–31).[36] Darwin bluntly challenges natural historians who insist that nonhuman animals are incapable of forming general concepts, proposing instead that nonhuman animals do "have this power, at least in a rude and incipient degree" (111). To bolster this argument, Darwin quotes the work of Leslie Stephen, who suggests that "[a] dog frames a general concept of cats or sheep, and knows the corresponding words as well as a philosopher. And the capacity to understand is as good a proof of vocal intelligence, though in an inferior degree, as the capacity to speak" (111–12). Of special relevance to Boyle's story are Darwin's comments about the higher apes. Darwin reminds us that all the higher mammals possess similar vocal organs, "constructed on the same general plan as ours, and used as a means of communication" (112). He goes on to suggest a reason for differences in how these vocal organs are adapted: varying social and environmental pressures. In other words, Darwin thinks it is "probable that these

same organs would be still further developed [in higher mammals] if the power of communication had to be improved" (ibid.). With respect to the higher apes his argument goes even further; higher apes possess vocal organs that "with long-continued practice might have been used for speech" (ibid.). As to why humans developed the capacity for speech and other primates did not, Darwin demurs, citing only "general causes," by which he means natural and sexual selection (ibid.). His thoughts on the subject, in keeping with the random nature of evolution, do not preclude the development in higher apes of the capacity for spoken language so prized by humans. Darwin's arguments in this part of *Descent* anticipate work done by animal behaviorists, who have been able to train their charges in the use of American Sign Language (ASL).[37] They also provide ammunition for Boyle's satire.

"Descent" pays homage to Franz Kafka's learned ape, Red Peter, who manages to "reach the cultural level of an average European."[38] Konrad's intellectual abilities far exceed the cultural level of an average American. He is a witty genius fluent in ASL and Yerkish, who has scored three operas and is writing a twelve-volume Yerkish epic.[39] Among the texts he has translated are Darwin's *Descent*, Noam Chomsky's *Language and Mind*, and Friedrich Nietzsche's *Beyond Good and Evil*. Just as Horne, who is portrayed as consistently confused by the story's events, is emasculated by Konrad's physical superiority, he is devalued in the face of Konrad's intellectual superiority. In the details of Konrad's hyper-intellectualism Boyle compresses Darwin's ideas about the evolution of mental powers into a decidedly nongeological time scale and stages a moment in which Darwin's theories about communication in higher apes have come to fruition.

Juxtaposing Konrad's superior intellect with Horne's cluelessness enables Boyle to examine the ways speciesist and racist discourses overlap. In addition to Jane and Horne, whose unremarkable speech patterns code them as white, the story includes three other human protagonists. Mr. and Mrs. U-Hwak-Lo, who run the Primate Center, are linguistically coded as Asian American. The unnamed janitor who works at the center is linguistically coded as African American. The primary scene that intermingles species and race anxieties occurs immediately after the restroom scene. As Horne watches from the door to the restroom, Konrad, "gesticulating with manic dexterity" (6), engages in conversation with the janitor. The two burst into laughter and the janitor translates their encounter for Horne: "Yo's wondering what me and Mastuh Konrad was jiving bout up dere, isn't yo? Well, ah tells yo: he was relatin a hoomerous anecdote, de punch line of which was deep cosmic implications in dat it establishes a common groun between monks and Ho-mo sapiens despite dere divergent ancestries" (7). The anecdote, of course, is borrowed directly from *Descent*, but the deeper implications of this scene derive from the way racial anxiety overlays species anxiety. In this episode Boyle conveys part of the late 1960s and early 1970s mood in the United States: the anxiousness of some Anglo-American men confronted by the civil rights movement.

Throughout "Descent" Boyle ratchets up Horne's level of anxiety about his deteriorating relationship with Jane and his deteriorating sense of identity. The story's climax and most discomfiting moment arrives in its last scene, as Jane and Konrad are interrupted *in flagrante delicto*. By this point in the story Jane has left Horne, taking her wok, natural foods cookbook, softball trophy, Rousseau reproductions, and collection of Edgar Rice Burroughs books. Despondent, the weeping Horne cherishes the "fermenting chunk of pineapple" she has left behind and begins "to long even for the stink of her" (15). Horne goes to the Primate Center in search of Jane and runs into the janitor, who informs him in no uncertain terms that she has left Horne because he does not understand her needs nor does he allow her to express the "natchrul inclination ob her soul" (ibid.). The janitor and the U-Hwak-Los both try to bar Horne from interrupting the "highly significant speriment" (16) in which Jane and Konrad are engaged, but in response to Jane's girlish giggle, which emerges from behind a closed door, Horne barges into the room. There he finds Jane, "legs and arms bare, pinching a lab smock across her chest," and Konrad, who wears only "a pair of baggy BVDs" (ibid.). Horne grabs Jane and is immediately hit by Konrad in an impact like that of "the grill of a Cadillac" (ibid.). The story ends with the indelible image of Konrad standing over Horne, who "look[s] up into the black eyes, teeth, fur, rock-ribbed arms" (ibid.) of the male who has beaten him in the competition for Jane.

Clearly, Horne has been removed from the possibility of sexual congress with Jane and the end of the story implies he is in imminent danger of being permanently removed from the gene pool. This scene brings together Boyle's transgression of the taboo of bestiality with Darwin's theories about sexual competition and selection, including the possible fertility of some cross-species hybrids (*Origin*, 221–48, esp. 229), and his sense of the importance of sexual reproduction (and variety) as engines of evolution. The cross-species nature of the sexual encounter contributes to Boyle's overall project of satirizing human fears about species boundaries and to his argument that humans deserve to have their anthropocentric attitudes challenged. Jane's selection of the fitter Konrad over the hapless and emasculated Horne represents, finally, the possible inauguration of improvements to the primate lineage—a positive, if fantastic, eugenics that Boyle applauds.

"IN THE COMPANY OF THE PACK": FAILURES OF CLASSIFICATION, NON-REPRODUCTIVE AFFILIATION, AND BECOMING-ANIMAL IN "DOGOLOGY"

"Dogology" departs from the Darwinian focus on reproduction in "Descent," which offers the possibility of inaugurating a new line of descent through heterosexual cross-species intercourse, and manifests instead a Deleuzo-Guattarian attention to becoming-animal and to nonreproductive affiliation. Whereas in

"Descent" Boyle produces a linear narrative, in "Dogology" he interweaves two different narrative threads, both centered on human-canine hybridity. The initial thread examines the confining domestic conventions of a suburban Connecticut neighborhood. In this part of "Dogology" Boyle turns his microscope on the marriages of Julian and Cara and Don and C.f., and the exploits of C.f., who leaves Don and joins a roving dog pack, upending the neighborhood's thin veneer of propriety. The second thread details the discovery in India early in the twentieth century of two feral wolf-children, Kamala and Amala, who are forcibly removed from their wolf pack. Although the Reverend Singh and his wife (who is unnamed in the story) take in Kamala and Amala and attempt to civilize and assimilate them into life in a human family, they meet with limited success.

Throughout "Dogology" Boyle juxtaposes themes of identity, entrapment, convention, civilization, domesticity, and boundary maintenance with those of behavior, movement, liberation, hybridity, and boundary crossing. He utilizes the stifling domestic conventions of suburban Connecticut, the religious strictures and species boundaries upheld by the Reverend Singh and his wife in their attempt to civilize Kamala and Amala, and the behaviors of C.f., Kamala, and Amala to explore the differences between the contours of being a "real" animal—a molar, stratified, ideologically bound, species-bound organism—and those of becoming-animal, producing a molecular animal. Ultimately, Boyle demonizes the conventions of the Connecticut suburbs and the civilizing attempts of the reverend and his wife, and celebrates the hybridity of the wolf-children and the sort of nonreproductive affiliation across species boundaries that C.f. enacts.

Boyle brings the strictures of civilized, molar identity to the fore in both narratives. In Connecticut, Julian and Cara Fox, Ben and Julie Ober, the La Portes, and C.f.'s husband, Don, discipline themselves into the norms of polite heteronormative society and busy themselves with stereotypically quotidian suburban activities: watching television, tending house, having cocktail parties, gossiping about neighbors. Boyle does not represent these activities, or the suburban domestic identity they underwrite, neutrally. For instance, in the story's opening scene, Julian stands, "beating eggs with a whisk and gazing idly out the kitchen window, expecting nothing" (32). His misplaced glasses are on the TV, "where he'd left them the night before while watching a sorry documentary about the children purportedly raised by wolves in India back in the nineteen twenties" (33). This scene of domesticity, however, is darkly tinged. The weather outside is dreadful, made oppressive by "the colorless hide of the day" and the "scrim of rain" (32). Inside is no less oppressive. In the living room "gloom ladled over everything, shadows leeching into black holes behind the leather couch and matching armchairs, the rubber plant a dark ladder in the corner and the shadowy fingers of the potted palms reaching out for nothing" (33). Lest these interior details seem only the result of meteorological conditions, Boyle reinforces the sense of gloom, dread, and tension by highlighting

Julian's irritation at a town ordinance, at the dog pack that shits on his lawn and destroys his flowerbed, and at his wife, Cara. He wishes she would "sleep and give him some peace" (ibid.), but she appears at breakfast "wearing her combative look" and butters her toast in a way that approximates "flaying the flesh from a bone" and "set[s] his teeth on edge" (37). Taken together, these and other details cohere into a portrait of suburban domestic life as entrapment.

Boyle's critique of one mode of civilizing, the conventions of contemporary suburban Connecticut, is augmented and complicated by the story of the wolf-children, in which the civilizing forces of colonialism and religion play a central role. The story of the wolf-children is set in the Mayurbhanj district in India during the 1920s, a period when British rule was still fully in force. The Reverend J. A. L. Singh, who heads an Anglican mission and orphanage, rescues two feral children from a wolf den in order to "baptize and civilize them" (47). Both the Reverend and Mrs. Singh see their civilizing mission as a noble duty, but through his descriptions of the naturalness of the behaviors of the wolf-children, the unnaturalness of the behaviors of the Reverend and Mrs. Singh, and the negative effects the attempted assimilation has on both children, neither of whom flourishes in their new environment, Boyle critiques their assimilationist, colonialist, speciesist project.[40] In other words, Boyle provides two different pathways for framing the wolf-children and the issue of their cross-species hybridity. On one hand, he offers an expository form of attention to the behavior of the wolf-children and their molecular becomings that neither anthropomorphizes nor exoticizes them. This is a nonspeciesist form of attention. On the other hand, he presents the molar, religiously inflected, identity-based attitudes of the Reverend and Mrs. Singh, who can only see the wolf-children as abductees forced to live "under the dominion of beasts . . . their eternal souls unsaved" (45); these attitudes mirror colonialist, bioimperialist, and speciesist projects of all sorts.

The tenor of the descriptions of the wolf-children is objective and neutral, hewing to what Deleuze and Guattari identify as the crucial role of "bearing witness to '*an inhumanity immediately experienced in the body as such*,' unnatural nuptials 'outside the programmed body'" (*Plateaus*, 273). Deleuze and Guattari are quoting René Schérer and Guy Hocquenghem's characterization of wolf-children, retaining and highlighting their language to draw a distinction between the notion of inhuman as not human, that is, using the human body in a molecular way it is not naturally programmed, and the notion of inhuman as inhumane. In "Dogology" Boyle tacks between both senses of inhuman, assigning the former connotation to the bodies and behaviors of the wolf-children and C.f., and the latter to the attitudes and behaviors of the Reverend and Mrs. Singh; C.f.'s husband, Don; and all of C.f.'s neighbors, except Julian. When he discusses the wolf-children Boyle does not offer access to their interior lives. Rather, he highlights the material transformations of their bodies and the lupine qualities of their behaviors. Travel-

ing on all fours has shaped their bodies, transforming them into bodies neither canine nor sapiens. Inhuman, they have callused elbows and knees, abnormally strong and inflexible toes, waists that are "narrow and extraordinarily supple, like a dog's," "necks dense with muscle that had accrued there as a result of leading with their heads," and they are "fast, preternaturally fast" ("Dogology," 52). When their den is attacked by the reverend and his men, the wolf-children huddle "in a defensive posture with the two wolf cubs, snarling and panicked, scrabbling at the clay with their broken nails to dig themselves deeper" (47). This description does not separate child from wolf: it applies equally to the lupine behavior of all four members of the pack. Once they are subdued, captured, and confined, they become objects of the reverend's scientific, anthropological, and religious curiosity. To develop the best tactics for civilizing them, he studies them for three days, recording his observations "in a leatherbound book he kept always at his side" (ibid.). On display as curiosities, the wolf-children persist in their lupine behaviors, "going on all fours, as if they didn't know any other way," "thrust[ing] forward to lap water like the beasts of the forest," "communicat[ing] with each other—and with their sibling wolves—with a series of grunts, snarls, and whimpers," hiding from the sun "as if it were an instrument of torture," and being nocturnally active, howling at the moon and "stalk[ing] the enclosure with shining eyes" (ibid.). In all his descriptions of them, Boyle highlights the trauma of removing the wolf-children from the environment for which their bodies and behaviors are adapted. Boyle represents their inhumanity, their becoming-animal, as ecologically appropriate.

In contradistinction to the inhuman flourishing that the wolf-children experience as members of the pack, Boyle presents the civilizing project of the reverend and his wife, who deploy the tools of religion, science, hygiene, and family life, as inhumane. The hybridity of the wolf-children vexes the reverend, who can only make them legible by positioning them as scientific objects, knowable through "close and telling examination of their physiology and habits" (52), and as souls to be saved. Entry into the reverend's notebook as scientific objects is an essential step in their domestication and control. And, as in "Descent," cleanliness plays a crucial role in this civilizing process. After the wolf-children have been caged at the orphanage for a few weeks, "they were pitiful, filthy, soiled with their own urine and excrement, undernourished" (47). Finally weak enough for her to handle them, Mrs. Singh puts them in restraints so she can bathe off the "filth and animal smell" and shave their heads "to defeat the fleas and ticks they'd inherited from the only mother they'd ever known" (48). These actions address their literal filth, but Mrs. Singh takes an additional step to cleanse them of their animal identity and prepare them for assimilation into human society. She anoints them with "delicate names" that will "reflect the beauty and propriety they will grow into." She names the younger child Amala, for a yellow Bengali flower, and the older child Kamala,

for lotus blossoms (ibid.). Both the washing and the naming of the wolf-children function implicitly as moments of colonizing. The washing scene prepares them as candidates for entry into civilization and the naming scene inducts them into molar human subjectivities, ruled by religion and family life.

Ultimately, however, neither Kamala nor Amala can inhabit these molar subjectivities. Domestication proves fatal for Amala, who is overpowered by the bioimperialism of her new environment. She dies soon after the two wolf pups have "succumbed to what the Reverend presumed was distemper communicated through the orphanage dogs" (53). The wolf pups have no immunity to diseases passed through domestic dogs, and Amala, who is suffering from fever and dysentery, cannot handle the dousing with sulfur powder that the Singhs use to cure her roundworms. While Kamala survives the treatment, at the end of the story Boyle suggests she is hardly better off than her sister. As the reverend watches the orphans play a game, Kamala "lay across the courtyard in a strip of sunlight, curled in the dirt with her knees drawn up beneath her and her chin resting atop the cradle of her crossed wrists" (55). By the end of the wolf-children's narrative, the wolf pack has been destroyed, the Singhs' civilizing project has failed, the inhumane treatment of Amala has resulted in her death, and Kamala has been, inhumanely, forced into the molar position of family dog.[41]

The trajectory of C.f.'s story reverses the trajectory of Kamala and Amala's. While they move from relative freedom, liberation, and hybridity into the confines of civilization, C.f. rejects a series of molar identities in favor of a molecular becoming-dog. Through the process of removing herself from the suburban human landscape and affiliating with a roving dog pack, C.f. becomes illegible. Her neighbors and husband find her unclassifiable, and although her becoming-dog is complicated by moments when others try to reimpose molar human identities, ultimately C.f.'s actions offer a primer on neoevolutionary queer ecological cross-species affiliation.

To begin becoming-dog C.f. sloughs off the molar identities of human, suburbanite, graduate student, and wife. She replaces her given name, Cynthia, with "'C.f., capital C, lowercase f'" (44), which signals her movement from the species *Homo sapiens sapiens* to the species *Canis lupis familiaris*.[42] The first time Boyle introduces C.f., she is violating the conventions of human suburbanite behavior; "down on all fours like a dog herself" (33), she is "out of proportion, all limbs, as if a dog had mated with a monkey" (32), and has joined the dog pack in marauding across suburban lawns. At a cocktail party thrown by Julian and Cara, which she unwillingly attends, C.f. again disregards suburban niceties. Although she arrives "upright and smiling," "her posture was terrible and she carried her own smell with her into the sterile sanctum of the house" (42). Within minutes of arriving she kneels beside a potted plant, wets one of her fingers, dips it in the soil, and tastes it. When asked by Julian what she is doing, C.f. replies she has

been training her senses, "reordering [them] so that she could think like a dog and interpret the whole world—not just the human world—as dogs did" (35). The form of study in which C.f. engages diverges markedly from the conventional field biology methods she used as a graduate student. She jettisons her notebook and tape recorder, "the accoutrements of civilization" that "got in the way of the kind of freedom she required" (40). In the repeated motif of the notebook, used by the reverend as a tool of scientific control and colonization and scrapped by C.f. because of how it positions her vis-à-vis the dog pack, Boyle highlights the mediating role of scientific instruments. Where the reverend uses the notebook to textualize and confine materiality he cannot classify, C.f. engages materially with an unfamiliar world, refusing the textualizing impulse. Of all the molar identities C.f. dissolves, only extricating herself from the position "wife" is accompanied by violence. She is out with the pack one day when Don comes to confront her: "When was she going to get her ass up out of the dirt and act like a normal human being? . . . When was she going to cook a meal, run the vacuum, do the wash. . . . He was wearing dirty underwear, did she know that?" (49). C.f. fails to answer in a manner Don finds satisfactory, and he kicks her in the ribs "as if he were driving a ball over an imaginary set of uprights in the distance" (ibid.). Following this unsuccessful attempt to reincorporate C.f. into the family structure, Don drives "down the street and out of her life" (50) and locks her out of the house. In this incident with Don and elsewhere in the story, Boyle scripts the possibility of a forced return into molar identity as a threat against which C.f. must be vigilant.

Although Boyle positions C.f.'s efforts as laudable, he is also careful to mark the limits of becoming-animal. C.f.'s physical embodiment means that no matter how well she reorders her senses and behaviors there will always be some sounds that are unavailable to her, some smells she will be unable to identify, some forms of canine movement and behavior she will be unable to enact. For C.f., moral feeling proves the trickiest element of human identity to shed. When the dogs kill an opossum, sniff its corpse "dispassionately," and then eat "the hairless pink young" as they leave the pouch, C.f. forces herself to try to feel nothing (37). Her inability to cultivate indifference marks her evolutionary difference. Even though, as Darwin reminds us in *Expression*, humans and dogs share a range of involuntary expressions, this scene highlights one kind of irreducible species difference between canine and human.[43] Despite the species differences that limit the extent of becoming-animal, Boyle highlights and celebrates the successes of C.f.'s molecular becoming and her successful incorporation into the pack. She trains her hearing away from the white noise of civilization so she can "tune it to the finer things, the wind stirring in the grass, the alarm call of a fallen nestling, the faintest sliver of a whimper from the dog three houses over, begging to be let out" (34). She develops her senses of smell and taste to the extent that a quick ingestion of potted plant soil

allows her to determine Julian and Cara used to have a dog (44). She recognizes that smell is the most important canine sense, and to mingle her smell with that of the pack, she wears the same clothes, "sans underwear or socks" (40), for weeks at a time. By engaging in canine activity with the pack, she is able to discern the pack hierarchy and the favored behaviors of various dogs, eventually training herself into "the rhythm of dogdom" (ibid.).

Boyle reinforces the allure of the pack, set against the strictures of the family, in the last scene in C.f.'s narrative. Julian finds C.f. "in the tall nodding weeds that concealed the entrance to the den" (54), where she plays with a new litter of feral puppies. Although he has come to ask her for one of them, his initial desire to acquire a family pet is undone by the sensuous pleasures of the pack, extended beyond humans and canines in this scene to encompass the whole of nature and the notion of radical receptivity to the natural world. Julian cannot pinpoint the reason he does so, but as he enters the field at the edge of the neighborhood he feels compelled to partially disrobe, removing his shoes, socks, and shirt. Discarding these conventions of civilization, he is able feel "the weeds, wildflowers, puffs of mushroom, clover, swathes of moss . . . clear and cool against the lazy progress of his bare feet" (ibid.). And when he arrives at the den and sits among the puppies, all thoughts of ownership dissolve in the face of his physical engagement with them. He feels "the thrusting wet snouts, . . . the surge of their animacy, the softness of the stroked ears and the prick of the milk teeth," and he smells "an authentic smell compounded of dirt, urine, saliva" (55). Julian's attunement to the nonhuman depends on his ability to abandon his molar ideologies, and this scene, taken together with C.f.'s becoming-dog, encapsulates the anti-molar, anti-anthropocentric, and anti-speciesist comportment for which Boyle argues in the story.

POSTHUMANIST ONTOLOGIES OF SPECIES: A NEW PLANETARY DOMESTICITY

Inheriting and extending the proto-posthumanist work of Darwin, the neoevolutionary queer ecologies Boyle portrays in "Descent of Man" and "Dogology" denaturalize and rewrite our understandings of human subjectivity, the animal natures of human beings, and concepts of species. Although as a taxonomic tool the term "species" has structured a range of discourses and material practices, among them scientific and pseudo-scientific rubrics of classification, environmentalist modes of conservation and preservation, cultural explorations of the term and its consequences, and essentialist and reductive practices of oppression and exploitation, I have suggested that Darwin, Freud, Deleuze and Guattari, and Boyle all rework the notion of species in a posthumanist key. The fundamental affinities they recognize in all organic bodies situate humans within, rather than

separate from, shared evolutionary histories and neoevolutionary presents and futures. As Noreen Giffney and Myra Hird remind us, the categories humanism and posthumanism are not internally homogeneous and, following Judith Butler, they warn us to be careful about "privileging one epistemological term over another," displacing humanism only to replace it with posthumanism.[44] However, Boyle's stories deserve the label posthumanist for the ways he highlights and critiques the limits of humanist taxonomies of species and how they detrimentally structure our encounters with others, whether human or nonhuman.

"Descent of Man" is Boyle's earliest posthumanist challenge to speciesist notions of human exceptionalism, and in portraying cross-species sexual selection and Jane's transfer of affection from male *Homo sapiens sapiens* to male *Pan troglodytes*, Boyle animates human anxieties about maintaining species boundaries by showing the arbitrariness, permeability, and mutability of those boundaries. In "Dogology" Boyle further fleshes out his posthumanist critique of species discourse. He illuminates the inhumane treatment meted out to Kamala, Amala, and C.f. in the name of molar, human species identity, offering multiple examples of the simultaneity of speciesist discourse and material oppression. In addition to foregrounding the suturing of species and oppression, Boyle presents an alternative model: inhuman molecular becomings-canine. The focus on hybridity in "Dogology" highlights the posthumanist understanding that bodies are always already multiple. For instance, as evolutionary microbiology reminds us, humans depend on symbiotic relationships with the bacteria that live in our digestive systems.[45] Furthermore, human genomes are found in only 10 percent of the human body's cells, while the other 90 percent have bacterial, fungal, and protist genomes.[46] So, what seems like one body in fact comprises many. In addition, Boyle's elevation of the pack over the family foregrounds affiliation, alliance, and agency, and backgrounds filiation and genetic inheritance, reworking our understanding and practice of what it means to be in relation to others.

In closing, I want to suggest that the neoevolutionary queer ecological frameworks offered in the work of Boyle, Freud, and Deleuze and Guattari, all of whom rework Darwin in different ways, instantiate a new form of planetary domesticity, a way of encountering and residing with others that productively overrides a single-species, anthropocentric, heteronormative, familial model. Taken together, "Descent of Man" and "Dogology" demonstrate that neoevolutionary queer ecological approaches to the concept of species, which are inherently posthumanist and some of which might problematize or altogether dismantle species as commonly understood, offer more complex and compassionate modes for encountering, describing, and ensuring the flourishing of all life on the planet. The last scene in C.f.'s narrative, in which she, the dogs, the new puppies, Julian, and the weeds, wildflowers, swaths of moss, leaves, grasshoppers, and sun constellate into a pack

animated by the "unalloyed sweetness of life" ("Dogology," 55), exemplifies this neoevolutionary queer ecological flourishing.

NOTES

I would like to thank the RISD students who have gamely engaged with me in conversation about the work of Charles Darwin, T. C. Boyle, Sigmund Freud, and Gilles Deleuze and Félix Guattari; the editors of this collection for their suggestions and support; and the humans and nonhumans at Seabreeze Terrace, who offered companionship and a temperate home away from home, and who made the dog days of summer an enjoyable time to be writing.

1. Charles Darwin, *On the Origin of Species* (1859; rpt., New York: Penguin, 2009); Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (1871; rpt., New York: Penguin, 2004); and Charles Darwin, *The Expression of the Emotions in Man and Animals* (1872; rpt., New York: Penguin, 2009). Cited hereafter as *Origin*, *Descent*, and *Expression*.

2. Michael T. Ghiselin, "A Radical Solution to the Species Problem," *Systematic Zoology* 23, no. 4 (1974): 541.

3. See especially "Descent of Man" (3–16), "The Extinction Tales" (99–107), and "Green Hell" (139–57) in T. C. Boyle, *Descent of Man* (1979; rpt., New York: Penguin, 1987).

4. Darwin, *Origin*, 427. See especially "Swept Away" (20–31) and "Chicxulub" (133–44) in T. C. Boyle, *Tooth and Claw* (New York: Penguin, 2005); "Question 62" (37–57), "Thirteen Hundred Rats" (189–203), and "La Conchita" (23–36) in Boyle's ninth collection, *Wild Child: Stories* (New York: Viking, 2010); and his novel *When the Killing's Done* (New York: Viking, 2011), all of which resonate with Darwinian traces.

5. See the epigraph to this essay, from Sophie Elmhurst, "The Books Interview: T. C. Boyle," *New Statesman* (May 5, 2011), http://www.newstatesman.com/books/2011/05/nature-world-alone-book-order (accessed July 17, 2011), where Boyle makes reference to two different, though intertwined, fields of inquiry in his work: "Charles Darwin" and "our relation to the environment." Eco-critics who take up Boyle's texts concentrate on the latter field, how Boyle deals with environmental issues and culture, to the almost full exclusion of the former, how his work relates to Darwin's. See, for instance, Joanna Durczak, "On the Transforming Energy's Side: T. C. Boyle's *A Friend of the Earth*," in *Walking on a Trail of Words: Essays in Honor of Professor Agnieszka Salska*, ed. Jadwiga Maszewska and Zbigniew Maszewski (Lodz: University of Lodz Press, 2007), 357–71; Sylvia Mayer, "American Environmentalism and Encounters with the Abject: T. Coraghessan Boyle's *A Friend of the Earth*," in *The Abject of Desire: The Aestheticization of the Unaesthetic in Contemporary Literature and Culture*, ed. Konstanze Kutzbach and Monika Mueller (Amsterdam: Rodopi, 2007), 221–34; and Gregory Meyerson, "Tortilla Curtain and the Ecology of Fear," *Contra-Corriente* 2, no. 1 (2004): 67–91.

6. "Descent of Man" originally appeared in *Paris Review* 18, no. 69 (1977), and "Dogology" in the *New Yorker* (Nov. 11, 2002). Citations for these stories refer to the following versions: T. C. Boyle, "Descent of Man," in *Descent of Man* (1979; rpt., New York: Penguin,

1987), 3–16, and T. C. Boyle, "Dogology," in *Tooth and Claw* (New York: Penguin, 2005), 32–56. Cited hereafter as "Descent" and "Dogology."

7. Robert Birnbaum, "T. C. Boyle: Author of Drop City Talks to Robert Birnbaum," *IdentityTheory.com: A Literary Website, Sort of*, Mar. 19, 2003, http://www.identitytheory.com/interviews/birnbaum94.html (accessed Jan. 30, 2012).

8. John S. Wilkins, *Defining Species: A Sourcebook from Antiquity to Today* (New York: Peter Lang, 2009), 1. Cited hereafter as *Defining*.

9. For a comprehensive overview of definitions of species from the classical era through the twentieth century, see John S. Wilkins, *Species: A History of the Idea* (Berkeley: University of California Press, 2009). For additional texts that deal with the concept of species, see Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage, 1994), 125–65; Mary Slaughter, *Universal Languages and Scientific Taxonomy in the Seventeenth Century* (Cambridge: Cambridge University Press, 1982); and Wilkins, *Defining*.

10. Cary Wolfe, introduction to *Zoontologies: The Question of the Animal*, ed. Cary Wolfe (Minneapolis: University of Minnesota Press, 2003), xx.

11. Cary Wolfe, *Animal Rites: American Culture, the Discourse of Species, and Posthumanist Theory* (Chicago: University of Chicago Press, 2003), 6. Cited hereafter as *Rites*.

12. For further elaboration on species discourse and its material consequences see ibid., 1–9, 163; Elizabeth Grosz, *Becoming Undone: Darwinian Reflections on Life, Politics, and Art* (Durham, N.C.: Duke University Press, 2011), 15–16, cited hereafter as *Becoming*; Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2008), 16–19; and Nicole Shukin, *Animal Capital: Rendering Life in Biopolitical Times* (Minneapolis: University of Minnesota Press, 2009), 9–11, 25, 75.

13. Charles Lyell's phrase to go "the whole orang" highlights the notion of fully embracing humans' kinship with other primates. Lyell uses the phrase in a letter to Thomas Henry Huxley, June 17, 1859, Imperial College Archives, Huxley Papers, 6:20, qtd. in *Sir Charles Lyell's Scientific Journals on the Species Question*, ed. Leonard G. Wilson (New Haven, Conn.: Yale University Press, 1970), 314, and in a letter to Darwin, Mar. 15, 1863, in *The Correspondence of Charles Darwin*, vol. 11: *1863*, ed. Frederick Burkhardt et al. (Cambridge: Cambridge University Press, 2000), 231, in which he discusses incorporating Darwin's ideas into his book *Geological Evidences of the Antiquity of Man* (London: Dent and Sons, 1863). In both instances the specific context is Lyell's discussion of Jean-Baptiste Lamarck's ideas.

14. See, for instance, examples of Social Darwinism and negative eugenics.

15. Here I paraphrase the useful definition of humanism offered by W. J. T. Mitchell in "Foreword: The Rights of Things," in Wolfe, *Rites*, xii.

16. Darwin only briefly addresses the mechanism of sexual selection in *Origin*, on 86–88, 122, 179–80, 182. It is not until *Descent* that he articulates the contribution of this mechanism to evolution.

17. Darwin directly references Thomas Malthus, *An Essay on the Principle of Population* (London: J. Johnson, 1798), on pages 14 and 66 of *Origin* and 63–65 of *Descent*. Malthus's theories of environmental limits underwrite Darwin's entire discussion of the struggle for existence on 63–79 of *Origin*.

18. For work that deals with the implications of Darwin's theories of sexual selection for

feminism, see, for example, Phillipa Hardman, "Darwin and Feminism," *Darwin and Gender: The Blog*, Feb. 23, 2012, http://www.darwinproject.ac.uk/gender/2012/02/23/darwin-and-feminism (accessed June 30, 2012); Grosz, *Becoming*, 115–68; Elizabeth Grosz, *Time Travels: Feminism, Nature, Power* (Durham, N.C.: Duke University Press, 2005), 13–34; Erika Lorraine Milam, *Looking for a Few Good Males: Female Choice in Evolutionary Biology* (Baltimore, Md.: Johns Hopkins University Press, 2010); and Griet Vandermassen, *Who's Afraid of Charles Darwin?: Debating Feminism and Evolutionary Theory* (Lanham, Md.: Rowman and Littlefield, 2005).

19. Figure 14, the visual illustration, is at *Expression*, 113. See also 58 for a brief remark on dogs uncovering their own canine teeth.

20. On the use of anthropomorphic language in Darwin's work, see Eileen Crist, *Images of Animals: Anthropomorphism and Animal Mind* (Philadelphia, Pa.: Temple University Press, 1999), esp. 11–50.

21. For Grosz's further discussion of Darwin's impact on the humanities and humanities-based research, see *Becoming*, 13–16.

22. For fuller definitions of queer ecology, see Catriona Mortimer-Sandilands and Bruce Erickson, "Introduction: A Genealogy of Queer Ecologies," in *Queer Ecologies: Sex, Nature, Politics, Desire*, ed. Catriona Mortimer-Sandilands and Bruce Erickson (Bloomington: Indiana University Press, 2010), 1–47; and Noreen Giffney and Myra Hird, "Introduction: Queering the Non/Human," in *Queering the Non/Human*, ed. Noreen Giffney and Myra Hird (Hampshire, England: Ashgate, 2008), 1–16. See also Timothy Morton, "Queer Ecology," *PMLA* 125, no. 2 (2010): 273–82.

23. On polymorphous infantile sexuality, see, for instance, Sigmund Freud, *Three Essays on the Theory of Sexuality*, trans. James Strachey (1905; rpt., New York: Basic, 1975), 57, 97, 100, 105. "Organic repression" is a term Freud defines in *Civilization and Its Discontents*, ed. and trans. James Strachey (1930; rpt., New York: Norton, 1962).

24. Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), cited hereafter as *Plateaus*.

25. For Deleuze and Guattari's initial definition of body as machine, see *Anti-Oedipus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1983), 1–14.

26. For an account of the relationship between Darwin and Deleuze (and Guattari) that relates to my discussion but pursues more actively a discussion of sexual difference, see Grosz, *Becoming*, 44–56, 88–98.

27. One additional element of this queering exists at the nexus of reproduction versus production. Becoming for Deleuze and Guattari is productive, though only sometimes reproductive. See, for example, the moment Deleuze and Guattari discuss the wasp-orchid. The coming together of the wasp and orchid is productive of the wasp-orchid assemblage, and it enables the reproduction of the orchid, but whether the orchid reproduces as a result of the wasp-orchid meeting is, for Deleuze and Guattari, immaterial (*Plateaus*, 238).

28. The names of the characters in "Descent" are witty and culturally allusive. The name Mr. Horne refers to the cuckold's horn and the name Konrad to ethologist Konrad Lorenz. Jane Good's name gestures to famous primatologist Jane Goodall and to the Jane

of the Tarzan stories, an intertextual nod Boyle underscores via the second epigraph for the collection—"Ungowa!"—borrowed from the film *Tarzan Finds a Son!* (dir. Richard Thorpe, Metro-Goldwyn-Mayer, 1939).

29. Freud read and made marginal comments in the 1875 German translation of *Descent* (Peter Gay, *Freud: A Life for Our Time* [New York: Norton, 1998], 5). On abjection, see especially Julia Kristeva, *Powers of Horror: An Essay on Abjection* (New York: Columbia University Press, 1982).

30. For Freud's full discussion of the separation of the ego from the external world, see *Civilization*, 12–16. On the pleasure principle and the necessity of instituting a reality principle, see ibid., 22–36.

31. See ibid., 46–47, for the full discussion of organic repression. On this passage, see also Wolfe, *Rites*, 2–3. For the section Freud echoes, see *Descent*, 68–78.

32. On human shame and its relationship to nonhuman animals, see also Jacques Derrida, "The Animal That Therefore I Am (More to Follow)," in *The Animal That Therefore I Am*, ed. Marie-Louise Mallet and trans. David Willis (New York: Fordham University Press, 2008), 1–51.

33. Even though nonhuman females select, Darwin characterizes them as the less active of the two sexes in the process of sexual selection. Whereas the males display, fight, and woo, the females merely choose. See, for instance, *Descent*, 256–57 and 465–74. Darwin notes a few exceptional cases in which nonhuman females are more eager and active in sexual selection than their male counterparts (*Descent*, 260–61), but overall nonhuman females are afforded limited agency.

34. Darwin discusses human female display on 640–46 and 665–66 of *Descent* and female choice on 666–68 of *Descent*. In both cases the context is observations of the behavior of "savages."

35. See 82–85 of *Descent* for Darwin's discussion of the relative sizes of human males and other apes.

36. On the topic of language and sexual selection, see also, for example, Grosz, *Becoming*, 18–21.

37. See, for instance, the examples of Koko the gorilla (Francine Patterson and Eugene Linden, *The Education of Koko* [New York: Holt, Rinehart, and Winston, 1981]), Nim Chimpsky (Elizabeth Hess, *Nim: The Chimp Who Would Be Human* [New York: Bantam, 2008], and Herbert S. Terrace, *Nim* [New York: Knopf, 1979]), and Alex the parrot (Irene Pepperberg, *Alex and Me* [New York: Harper, 2009]).

38. Franz Kafka, "A Report to an Academy," in *Franz Kafka: The Complete Stories*, ed. Nahum N. Glatzer (New York: Shocken, 1971), 258. Boyle acknowledges "A Report to an Academy" directly, employing a quotation from the story as the collection's first epigraph.

39. Boyle invents the Yerkish language, a sly allusion to primatologist Robert Yerkes. See Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York: Routledge, 1989), 59–83, for an assessment of Yerkes and the Yale Primate Biology Laboratories.

40. Although Boyle doesn't make this connection, the way he describes the attempted assimilation of Kamala and Amala reverberates with tactics used to assimilate Native Americans in the United States in the early twentieth century. See, for instance, Zitkala-Ša, "The

School Days of an Indian Girl," in *American Indian Stories, Legends, and Other Writings*, ed. Cathy N. Davidson and Ada Norris (New York: Penguin, 2003), 87–103. Boyle's juxtaposition of the explicitly colonialist story of Kamala and Amala with C.f.'s story conjures for readers a sense of the colonialist history of the United States.

41. Pet keeping is one of the practices Deleuze and Guattari highlight as an activity that is molar for both the humans and the pets (*Plateaus*, 233, 240–41).

42. Carl Linnaeus made the initial classification of domestic dogs as *Canis familiarus domesticus* in 1758 (*Systema naturae per regna tria naturae: secumdum, classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*, 10th ed. [Holmiae: Laurentii Salvii, 1758], 38). For online access to *Systema naturae*, see *Biodiversity Heritage Library*: http://www.biodiversitylibrary.org/page/726931. In 1993 domestic dogs were reclassified as *Canis lupus familiaris*, a subspecies of the gray wolf *Canis lupus*. *Canis familiaris* is a recognized synonym for *Canis lupus familiaris*.

43. On the irreducibility of species difference, see, for instance, Derrida, "The Animal," 1–51.

44. Giffney and Hird, "Introduction: Queering the Non/Human," 3.

45. See, for instance, Lynn Margulis, *Symbiotic Planet: A New Look at Evolution* (New York: Basic, 1998), 5.

46. Haraway, *When Species Meet*, 3. For additional discussion of the multiplicity of bodies, see ibid., 3–42.

VIRGINIA RICHTER

Ape Meets Primatologist

Post-Darwinian Interspecies Romances

DARWINISM IN THE UNITED STATES: SCIENCE, RELIGION, AND LITERATURE

The Scopes trial that took place in 1925 at Dayton, Tennessee, has remained to this day one of the defining events in the positioning of Darwinism on the American scene. Highly publicized at the time, and inscribed in popular cultural memory through the film *Inherit the Wind* (1960), the Scopes trial stages the U.S. encounter with Darwinism as a pervasive "image of confrontation between evolutionism and religion,"[1] setting an enlightened America that believes in the Constitution and scientific progress against a fundamentalist America that believes in the Bible. Twenty-first-century research has shown that the engagement with evolutionary theory in the United States has been more complex than this dichotomous opposition suggests; however, the coverage of the Scopes trial established an enduring framework for future representations of Darwinism.[2]

The popular epithet for the events at Dayton, the "monkey trial," points to one of the central questions raised by Darwin: his claim that human and nonhuman primates are genealogically related and that, consequently, the human species does not have a unique, separate status (I call this the "Darwinian narrative"). This contention has always, and everywhere, constituted the core of the popular fascination with Darwin's theory,[3] but in the United States this interest is intertwined in a peculiar way with religious fundamentalism and its insistence on the special creation of man. As Peter J. Bowler argues, however, evolutionary theory and Christian belief are not necessarily mutually exclusive.[4] In Europe, Protestant as well as Catholic theologians, for example Pierre Teilhard de Chardin, have found ways to reconcile evolutionary theory with a liberal theology. The early reception of Darwinism in the United States, initially limited to academic debates, especially

among theologians influenced by German philological criticism of the Bible, was similarly accommodating.[5] But in the early twentieth century, fundamentalism emerged as a widespread popular movement that postulated a literal belief in Genesis and a concomitant repudiation of evolution.

The Darwinian question of human-ape kinship has been taken up in two recent novels, Sara Gruen's *Ape House* and Benjamin Hale's *The Evolution of Bruno Littlemore*, which will be discussed below. While both novels emphasize, in very different ways, the inclusion of both humans and great apes in a single family of primates, they cannot quite escape the American tradition epitomized by the Scopes trial. Hale's *Bruno Littlemore* tackles the confrontation between evolution and Christianity head on: in his novel, the sexual relationship between a woman and an ape—which results in a pregnancy—attracts the ire of Christian fundamentalists. The ape's autobiography can be regarded as a speech act intended to offer a powerful counternarrative to the foundational tale of human superiority. In *Ape House*, the conflict between religion and evolution is present only as an undercurrent. Christian fundamentalist opposition to Darwinism is not explicitly broached, but rather displaced onto a less radical, conservative position: the celebration of intraspecies heterosexual reproduction and the exclusion of homosexuality. Gruen succeeds in reconciling two incompatible positions, the Darwinian narrative and the clean segregation of the species. In different ways, the clash of values staged at the Scopes trial continues to reverberate even in a cultural context that is informed by ecological concerns, feminism, and a critique of anthropocentrism.

At Dayton's monkey trial, the well-known lawyer Clarence Darrow presented a purely legal argumentation—the implications of the Tennessee Constitution for the teaching of science, no matter what its content—on behalf of the defense; for the prosecution, William Jennings Bryan engaged in an epistemological, theological, and ethical critique of evolutionary theory as such. Two aspects of the science brought up by Bryan—Darwin's conflict with the Bible, and the "hypothetical" nature of evolutionary theory—are of particular relevance here, the first because it brings us to the center of debates in the wake of Darwinism, the second because of its implicit importance for textual studies. As Bryan claimed in the first place, Darwin's proposition that all mammals, and specifically humans and apes, are descended from a common ancestor undermines the biblical account of the separate creation of each species, and the divine establishment of man as apart from and above the natural world. The Darwinian deposing of anthropocentrism entails, Bryan believed, "a degradation of man" and, in consequence, atheism, social unrest, and the brutalization of humankind that had culminated in the First World War.[6] As Jeffrey P. Moran points out, Bryan had long held the belief that the Darwinian "struggle for existence" constituted an endorsement of warfare in general, and that German militarism in particular had been shaped

by the influence of Darwin and his German follower Friedrich Nietzsche.[7] Such concerns about the negative social effects of Darwinism were not unique to the United States; in Europe, they were linked to a sociomedical discourse on degeneration. In this discourse, religion, as an institution in charge of moral instruction and control, played a role as a socially stabilizing factor counteracting the negative influences of modern life; however, the vested interest in a literal interpretation of the Bible constitutes a defining factor of a specifically American anti-evolutionism.[8]

Bryan's second objection to the teaching of evolution was that evolutionary theory was a mere hypothesis, unproven by empirical fact or scientific demonstration: "There is no more reason to believe that man descended from some inferior animal than there is to believe that a stately mansion has descended from a small cottage. Resemblances are not proof—they simply put us on inquiry. As one fact, such as the absence of the accused from the scene of the murder, outweighs all the resemblances that a thousand witnesses could swear to, so the inability of science to trace any one of the millions of species to another species outweighs all the resemblances upon which evolutionists rely to establish man's blood relationship with the brutes" ("Summation," 42). Unlike the law of gravity, which every layperson can test by ocular proof (drop an apple and see what happens), evolution is not testable within a strictly empirical epistemology, that is, by direct observation. As Bryan maintained, "the wisest scientists" have not been able to place evolution at the scene of the murder, so to speak, whereas a "law" that is antithetical to the principle of natural selection (and its unpredictable outcome) is as evident to "any child" as is Newton's law of gravity: "a spiritual gravitation that draws all souls toward heaven" (ibid.). By insisting on the general upward gravitation of creation, Bryan attempted to defend the notion of a designed and ordered nature as the basis of an unchanging social order—indicated by the metaphor of similarly unchanging mansions and cottages—and, in the context of the American South, of racial separation. The individual creation of each species and the dominion of (white) men over nature are key features of this worldview.

As became evident at the trial, Bryan's grasp of evolutionary theory was flawed by his ignorance of the latest developments in various disciplines that supported Darwinian evolutionary theory, for example the discovery of early hominid fossils, which contributed to closing one of the most conspicuous gaps in Darwin's argumentation,[9] and, more important, the work that had been going on in genetics since the turn of the century, which was to contribute to the evolutionary synthesis in the 1930s and 1940s.[10] Evolution was a "hypothesis"—in the sense of "not proven"—only within an epistemology that was already obsolete at the time of the trial. However, by harping on the improvability of evolutionary theory, Bryan was unwittingly responding to an aspect that Darwin did not fail to emphasize

himself: the preliminary, inchoate nature of the chain of evidence presented in *On the Origin of Species*.[11]

Far from being a weakness in Darwin's argumentation, his strategic rhetorical modesty, together with the empirical richness of *Origin* (the many examples accumulated over more than twenty years), contributed to the swift acceptance of his theory despite various gaps in the scientific knowledge of his time.[12] One of Darwin's most important frames of reference, domestic breeding or "artificial selection," provided an analogy that only went so far: breeding produces variation within a species, from chihuahuas to St. Bernards, but not entirely new species. The mechanism of inheritance was as yet unknown; the significance of Gregor Mendel's experiments on plant hybridization, while carried out in Darwin's lifetime, was only recognized in the early twentieth century. However, Darwin was not only aware of these gaps, he was ready to point them out. In addition, he sought authority by uniting scientific methods of inquiry with methodologies and rhetorical strategies derived from the humanities, thereby transforming the epistemological foundations of his field from an inductive natural history to a science based on abduction (a term coined by Charles Sanders Peirce): the development of probabilistic scenarios, or "thought experiments," which are then subjected to further testing.

As David Amigoni has argued, Darwin succeeded in establishing credibility for his theory by aligning his own methodology with the textual methods developed in philology, in other words through a double affiliation with the literary field. First, "Darwin's rhetorical strategy draws its persuasive power from the cultural authority associated with linguistic and literary knowledge,"[13] that is, Darwin sought the prestige of these established disciplines for his own emerging field—as did other groundbreaking naturalists before him, such as Charles Lyell, who bolstered the authority of his *Principles of Geology* (1830–33) by numerous references to the classics. Second, by choosing the traditional metaphor of the "book of nature" as his operative trope, but giving it a particular twist—the book of nature is fragmented and therefore only readable if carefully deciphered and reconstructed—Darwin could point out the methodological parallels between philological criticism (which generated a view of the Bible as a historical document), the principles of modern geology (uniformitarianism, actualism, and a steady-state view of the earth) established by Lyell (which not only showed that the earth was much older than the Bible suggested, but which also provided the foundations for Darwin's own work in biology),[14] and his own reflections on the mutability of species. Darwin posited a basic analogy between linguistic change and the transmutation of species. In consequence of this analogy between philology—which could infer, on the basis of the similarities between living languages, a vanished "common ancestor," for instance the Indo-European language—and biology, which in Darwin's hands could

similarly postulate a "missing link" connecting two extant species, the imperfection of the fossil record was turned from an obstacle to, almost, a confirmation of evolutionary theory: "Thus a complex understanding of 'literature' consisting of historically descended and interrelated linguistic traditions, as well as the book as an organic object in history, helped Darwin to mount the positive argument for the fragmentary evidence of evolutionary change."[15]

In addition to Darwin's rhetorical strategy of self-authorization and the methodological affinity between philology and evolutionary theory, there is a third instance in which Darwinism is aligned with the literary field: the thought experiment. George Levine defines "thought experiments" as "probabilistic stories" that play a crucial role in Darwin's argumentation in *Origin*.[16] Whereas in the process of institutionalizing scientific disciplines and establishing good scientific practices that took place in the nineteenth century, the lab experiment emerged in the natural sciences as the privileged practice to differentiate—and exclude—"non-knowledge" from knowledge, the literary technique of the thought experiment acquired a new relevance in the non-experimental sciences. Because of Darwin's ample usage of thought experiments as an epistemological practice, Darwinism currently is of particular interest to the newly emergent field of "agnotology" or "nescience," which is connected mostly to the history of science and historical epistemology but also to research in the humanities. Robert N. Proctor and Londa Schiebinger define the field as "the study of ignorance making, the lost and the forgotten."[17] Ignorance, they suggest, doesn't just happen; it is the result of processes of evaluation and exclusion, even of conscious suppression. In the context of German studies and the history of science at some Swiss and German universities and research centers,[18] however, related research has developed a specific focus on nescience and literature that aims at establishing "non-knowledge" as a productive force, as opposed to the absence of knowledge, which is perceived as loss, misinformation, or censorship. Instead, nescience is closely connected to curiosity and wonder and consequently forms a precondition for scientific inquiry.

The literary scholar Michael Gamper has elucidated the links between the marked "non-knowledge" in Darwin's writing and Darwin's use of "speculative" and "literary" techniques, which resulted in transforming a scientific field—evolutionary theory—into a rich cultural archive that brought forth numerous creative responses. From the beginning, the debate on Darwin's theory took place in popular fiction and visual representations as well as in academic texts, and this has to do with the form of Darwin's argument and with its provocative content. Since Darwin's central hypotheses could not be observed in nature, his theory formation, according to Gamper, by necessity contained speculative elements. However, Darwin succeeded in turning this epistemological weakness into a strength:

> Being able to recognize the similarities between seemingly unconnected phenomena and to produce series of comparable circumstantial evidence within the immense material archive of natural history of his time were the strengths Darwin played out in his books, and with which he responded to the specifics of his own science: namely to the fact that it operated not only in space but particularly in time, that it worked historically rather than experimentally and that it was concerned with processes which eluded direct observation. To do this required a great deal of imaginative creativity on the level of mental capacities; on the level of linguistic representation, however, it needed metaphor, analogy, and narrative.[19]

As studies from Gillian Beer's seminal *Darwin's Plots*[20] to George Levine's *Darwin the Writer* have shown, Darwin's writing was highly literary—inseparably linking empirical observation with imagination, description with narrative, and serialization with anecdote and metaphor—and thereby provided many points of departure for fictional engagements with evolutionary theory, a creative repertoire that has lost nothing of its productive potential ever since. Arguably, the uncertainty or non-knowledge constitutive of Darwinian evolutionary theory contributed to generating narratives about what Thomas Henry Huxley called the "question of questions for mankind": "the ascertainment of the place which Man occupies in nature and of his relations to the universe of things."[21] More specifically, the Darwinian narrative of changing species and human-simian kinship invited the production of literary thought experiments such as H. G. Wells's scientific romances: fictional explorations of the potential of evolutionary theory when pushed to its imaginative limits.

In contemporary American fiction, apes are quite a topos, making their appearance in various works from Michael Crichton's science fiction novel *Congo* (1980), in which the gorilla, Amy, trained in sign language, serves as a mediator between a group of American explorers and murderous mutant gorillas in the African rain forests, through Bernard Malamud's dystopian fantasy *God's Grace* (1982), featuring a lonely human survivor of a thermonuclear disaster who tries—and fails—to restart creation with a group of apes, to Daniel Quinn's philosophical novel *Ishmael: An Adventure of the Mind and Spirit* (1992), in which a wise gorilla discusses ethical questions with a human pupil.[22] Widely different in generic affiliation, aesthetic sensibility, and moral seriousness, these novels use the speaking ape as a figure of interspecies mediation, but conversely also to mark the ultimate difference between human and nonhuman primates.

Two recent ape novels, Sara Gruen's *Ape House* (2010) and Benjamin Hale's *The Evolution of Bruno Littlemore* (2011), differ in various ways from their predecessors published in the 1980s and 1990s. In contrast to the exotic settings of *Congo* and *God's Grace* (*Ishmael* is set in New York), Gruen and Hale choose specifically contemporary, American settings (Kansas City, Philadelphia, and Los An-

geles in *Ape House*, Chicago and New York in *Bruno Littlemore*). While Gruen and Hale use their ape figures to criticize various aspects of the American way of life—consumerism, the lack of sustainability, the cruelty to animals in industrialized research, and the voyeurism of mass media—they do not share Malamud's, Quinn's, and Crichton's interest in a larger dystopian vision. Rather, their focus is domestic, geared to the family and interpersonal relations (persons, nota bene, including apes). Another significant difference from *God's Grace* and *Ishmael* (but not from *Congo*) is the choice of women primatologists—in both cases, young, beautiful, blonde, and of junior standing as scientists—as the main participants in the human-simian encounter, reflecting the prominent role of women in primatology and their supposedly more empathetic approach to their objects of study. Both novels juxtapose caring women scientists, specializing in ape language acquisition and social behavior, with "hardcore" male biologists, who do not shrink from harmful animal experiments. Another difference is that these women primatologists' simian counterparts are not gorillas, whether wise or murderous, but chimpanzees (in *Bruno Littlemore*) and bonobos (in *Ape House*).

Human-simian communication is a central issue negotiated in both novels. Various experiments conducted since the 1960s on chimpanzees' and gorillas' capacity to acquire American Sign Language have generated discussions about ape intelligence and about human-ape similarities and differences.[23] The contested outcomes of these experiments open up a productive space of uncertainty and non-knowledge that is filled by literary texts. Fiction can explore thought experiments in which apes not only master ASL and communicate via computers (*Ape House*), but even achieve vocal articulate language and, in fact, become first-person narrators of their own life stories (*Bruno Littlemore*). While novels such as *Ape House* and *The Evolution of Bruno Littlemore* confer personhood on their nonhuman agents, it is still questionable whether they succeed in "confronting the problem of nonhuman others," as demanded by Cary Wolfe, a leading proponent of posthumanism.[24] According to Wolfe, the aims of posthumanist theory consist of, first, analyzing and countermanding the pervasive privileging of "the human" in Western philosophy ("speciesism"), and second, stressing the inextricable embodiment—the animal, evolutionary roots—of humans as well as their embeddedness in and subservience to a material, technological, and informational environment (*Rites*, 5–6). It is this shared creatureliness of humans and animals that constitutes the ethical basis of posthumanism: "the fundamental ethical bond we have with nonhuman animals resides in our shared finitude, our vulnerability and mortality as 'fellow creatures.'"[25]

Despite their pro-ape stance, Gruen's and Hale's novels comply with these posthumanist objectives only partly at best. By giving their chimpanzee and bonobo protagonists the ability to speak—whether using articulate speech or sign language—both novels suggest that personhood, with its attendant rights, is not a

human prerogative; but they achieve this at the price of anthropomorphizing the animals. This is, generally speaking, the formula of contemporary ape fiction. Few if any novels with simian protagonists show an interest in exploring the phenomenological differences—for instance, the difference in sense perception—between humans and apes.[26] By representing their simian protagonists as deserving of consideration because they are so similar to humans, Gruen's and Hale's novels remain vulnerable to the charge of speciesism. On the other hand, they indicate that in contemporary culture it is no longer possible to construe the human as an entity that can transcend its animality and materiality. However, the move that both novels make to highlight the embodied state of the human is itself problematic, as I discuss below: in both cases, it is the *female* body—traditionally conceptualized as closer to nature than the male—whose material, biological condition is marked out.

Although *Ape House* and *The Evolution of Bruno Littlemore* manifest various similarities on the levels of plot, types of protagonist, and genre—both combine elements of the Freudian family romance[27] with that of a romance proper—they are vastly different in the effects they achieve with these materials. *Ape House* is committed aesthetically and semantically to realist representation, whereas *Bruno Littlemore* embraces the tendencies of postmodern literature. These divergent aesthetic commitments are mirrored in the diegetic representations of the apes' respective language use. While Gruen's bonobos employ their language skills in a way that is presented as unproblematic—they succeed in unequivocally bringing across their meaning, at least to those who are willing to look for it—Bruno's autobiography is more interested in the deferral of meaning: it is self-referential, digressive, and full of intertextual references. This stylistic postmodernism is accompanied on the semantic level by ostentatious displays of sexual transgression, including homosexuality and bestiality. The interaction between humans and bonobos in *Ape House*, in contrast, remains carefully sanitized even while it is represented through the trope of the family (in the Freudian view, a highly sexualized space). Sexuality in *Ape House* is delimited by species boundaries. Moreover, while the bonobos, a species that has become famous for its high level of sexual behavior, represent an alternative society remarkably free from repression, human sexual relations in the novel do not transgress the conventions of heteronormativity.

LANGUAGE AND SEXUALITY IN *APE HOUSE*

In *The Descent of Man* (1871), Darwin asserts that "man is descended from some lower form, notwithstanding that connecting-links have not hitherto been discovered,"[28] thus stating explicitly what was only implied in *On the Origin of Species*. Even more radically, he includes the "higher faculties," such as abstract reasoning, the aesthetic sense, and the ability to communicate, into the evolutionary narrative. In contradistinction to Thomas Henry Huxley who, as a comparative anatomist,

asserted the physical continuity of humans with other species but claimed that "the vastness of the gulf between civilized man and the brutes"[29] was constituted by uniquely human mental capacities, Darwin only saw a difference of degree. In particular, Huxley reserved the traditional Cartesian difference marker, "the marvellous endowment of intelligible and rational speech,"[30] for the human species; in consequence, man is the only living being capable of passing on his accumulated experience from one generation to the next and, therefore, of producing culture. In contrast, Darwin postulated that articulate speech had developed out of gestures and vocalizations, which in turn were connected to emotions shared by humans and animals. In other words, human language clearly has roots in an animal nature common to all species: "The habitual use of articulate language is, however, peculiar to man; but he uses, in common with the lower animals, inarticulate cries to express his meaning, aided by gestures and the movements of the muscles of the face. This especially holds good with the more simple and vivid feelings, which are but little connected with our higher intelligence. Our cries of pain, fear, surprise, anger, together with their appropriate actions, and the murmur of a mother to her beloved child, are more expressive than any words" (*Descent*, 88).

Language is not a "gift" uniquely bestowed on humans. Rather, it has a biological basis and has evolved according to the laws of natural selection: "no philologist now supposes that any language has been deliberately invented; it has been slowly and unconsciously developed by many steps" (*Descent*, 89). The first steps were initiated in human prehistory and have analogies in animal means of communication; for example, Darwin compares the interplay between babies' "instinctive tendency to speak" (ibid.) and the active (cultural) acquisition of language with birdsong, which in each species is similarly universal and instinctive while showing regional variations. In addition to the close connection of "inarticulate cries" and gestures with the emotions, the ability to imitate—to "ape"—shared by all primates is for Darwin the key to the evolutionary emergence of language.

Darwin's reflections on language are, like many of his other tenets, backed up by thought experiments compounded with observations (by Darwin himself or one of the many naturalists with whom he corresponded) and speculative inferences: "Since monkeys certainly understand much that is said to them by man, and when wild, utter signal-cries of danger to their fellows . . . , may not some unusually wise ape-like animal have imitated the growl of a beast of prey, and thus told his fellow-monkeys the nature of the expected danger? This would have been the first step in the formation of language" (*Descent*, 90). The subjunctive marks the hypothetical nature of the thought experiment at this stage of his theory formation. Fiction, by definition written in an "as if" mode, is a medium that can develop scientific thought experiments into larger, coherent narratives. In Darwin's lifetime, various writers of fiction explored the implications of evolution not only for the future of humankind, but also for its past.[31]

Since Wolfgang Köhler's behavioral experiments in which he was able to show that chimpanzees have the capacity to deliberate and to solve problems (*The Mentality of Apes* [1917]), research into apes' cognitive and communicative abilities has been extensive, culminating in attempts to teach gorillas and chimpanzees to communicate (with humans and with each other) via ASL or other means.[32] However, the evaluation of such experiments, and of the research conducted by linguists, anthropologists, and primatologists, is highly contested. There is no agreement among experts on the related questions of simian "speech" and "animal culture." To take one prominent position: Michael Tomasello, the director of the Max Planck Institute of Evolutionary Psychology at Leipzig, bases his claim that human communication emerged out of gestures rather than vocalization on his work with nonhuman primates: the vocalizations of great apes are genetically fixed whereas gestures are learned and can be used flexibly.[33] This suggests that there *is* continuity between simian and human modes of communication, just as Darwin maintained. However, while apes have the ability for intentional communication, according to Tomasello they lack cooperative communication, that is, they do not share with humans "prosocial intention" or altruism. In other words, for Tomasello altruism and cooperation do not only constitute the basis for human communication but, specifically, they are what distinguishes human from simian interaction: ape communication is based on individual practical reasoning, human communication on cooperative reasoning. Shared intentionality is something that other species lack: "This fundamentally cooperative process makes human communication utterly different from the communicative activities of all other species on the planet."[34]

This insistence on human uniqueness, albeit in a single circumscribed sector, is contested by the primatologist Frans de Waal and other advocates of animal culture, who stress "the similarities of animal traditions to human culture, focusing on common characteristics, such as behavioural variation underpinned by social learning, group-specific repertoires, or the diffusion of innovations."[35] My point here is twofold: first, even for the proponents of animal culture and critics of anthropocentrism, humankind continues to provide the benchmarks other species have to meet. Second, the field of inquiry opened by Darwin has not been closed. The question of humans' and apes' relative status, and the epistemological and ethical consequences following from any conclusion, is still up for discussion. It is precisely this ultimate undecidability that opens up a productive space for literary thought experiments about speaking apes.

Ape language acquisition is one of the interests shared by Sara Gruen's and Benjamin Hale's novels. In these works, human-simian communication is explored in various settings of animal research and display, such as a behavioral studies lab, a zoo, a theatrical performance, and reality TV. One crucial difference between the two novels is their choice of narrative structure. *Ape House* is narrated from an external vantage point without a personalized narrator, and the focalization shifts

between various figures: the two main protagonists, the journalist John Thigpen and the primatologist Isabel Duncan, and the group of bonobos who constitute the novel's center of interest. In *The Evolution of Bruno Littlemore*, in contrast, we find an embodied first-person narrator and internal focalization; the story is told by the eponymous hero, an articulate chimpanzee who dictates his memoirs to a human amanuensis. These decisions on narrative presentation have consequences for the different literary thought experiments on ape language acquisition. While both novels affirm that apes have language, in *Bruno Littlemore* this is performed and commented on by the speaking ape himself, whose effectively human status is thus spectacularly displayed.

Whereas we follow Bruno's process of language acquisition and acculturation step by step, in *Ape House* the bonobos are presented from the beginning as accomplished users of ASL and specially designed computers. Apes' linguistic capacity is therefore not problematized; it is presented as a given. The absence of any discussion of the possible limitations and difficulties of human-ape communication implies a concept of language that ignores the conditions of *human* communication that have been part of linguistics since Ferdinand de Saussure: that language is not expressive but constitutive of significance, that the sign is arbitrary, and that meaning is equivocal and endlessly deferred. In *Ape House*, language is transparent and untroubled; problems in understanding are either of a technical (some humans are not skilled in ASL) or a psychological and ethical nature (some human interlocutors do not recognize the apes as valid subjects of communication). For John Thigpen, the assignment to write an article about the inhabitants of the Great Ape Language Lab in Kansas City results in a complete overthrow of his preconceived worldview: "He'd had a two-way conversation with great apes. He'd spoken to them in English, and they'd responded using American Sign Language, all the more remarkable because it meant they were competent in two human languages. . . . He'd looked into their eyes and recognized without a shadow of a doubt that sentient, intelligent beings were looking back. It was entirely different from peering into a zoo enclosure, and it changed his comprehension of the world in such a profound way he could not yet articulate it."[36] Because he meets them in an egalitarian environment—the lab is run on "non-coercive" principles, and the bonobos are actually consulted before visitors are allowed in—John is enabled to recognize their equality. His discovery that humans are not the only "sentient, intelligent beings" on earth results not only in a revision of his tacitly anthropocentric assumptions, but also in an examination of his own life. The encounter with the bonobos makes John aware that his private and professional lives have been directed by external interests to the detriment of his true values, such as journalistic integrity, on the one hand, and unreserved personal commitment, on the other hand.

The John Thigpen plot line can be described as a triple quest: for a restoration

of his professional integrity, for a restoration of his marriage, and for an acknowledgment from the bonobos that reciprocates his own recognition of their personhood. This last aspect is exemplified by a minor but pertinent episode: while John gets very friendly with the apes and perceives, to his surprise, "how distinct, how differentiated, how almost *human*" (6) they are, he is not attentive enough to see that one of them, the young adult male Mbongi, is wearing a gorilla mask. John's misapprehension results in Mbongi's being offended and declining to interact further with the visitor, at which John in turn is left "feeling as if he'd slapped a baby" (ibid.). This breach is only healed in the novel's final scene, when Mbongi accepts a piece of carrot cake brought by John, who by then has turned from a metaphorical baby-slapper to a father-to-be as well as a pet keeper *and* a successful reporter on nature conservation projects. The bonobos function as catalysts for this process of renewal. The phrase that they are "almost *human*" is a giveaway, however, for the novel's fundamentally undisturbed humanism, which coincides with its heteronormativity to the point of affirming quite traditional "family values" even if the bourgeois family now includes nonhuman creatures.

It is significant that the apes in question are bonobos, the chimpanzees' close relatives famed for their peacefulness and sexual activity. As the primatologist Christophe Boesch summarizes the research on populations living in the wild, the bonobo (*Pan paniscus*) has been portrayed "as overly sexual, with regular homosexual interactions between the females, and as exhibiting very cohesive social grouping patterns, with females dominant over males."[37] Chimpanzees (*Pan troglodytes*), in contrast, are described as living in less-cohesive, smaller groups, with social males dominant over the females. In addition, as Jane Goodall's research has shown, chimpanzees can exhibit intraspecies violence and even engage in "warfare" with neighboring populations, a type of behavior that certainly has caught the popular imagination.[38] However, as Boesch cautions, the alleged differences between bonobos and chimpanzees may rather be due to "the ecological conditions prevailing in the populations under consideration than to interspecies differences";[39] moreover, fewer data are available on bonobos than on chimpanzees, so generalizations about the behavior of the whole species are not reliable.

Whatever primatology has to say on the matter, the bonobos' popular attributes are given great weight in Gruen's novel. While their basic similarity to humans is stressed—at the outset, we are informed that bonobos and humans "share 98.7 percent of their DNA" (4)—they are presented as a better, utopian version of humanity. (It should be noted that the human genome also closely resembles that of frogs.[40] While human kinship with apes has become not only accepted but embraced in contemporary popular culture, the more radical claim shared by Darwinism and posthumanist theory that even frogs—and insects, and all the rest—are our "cousins" may still provoke some visceral resistance.) Whereas the bonobos remain peaceable, playful, and loving throughout the narrative, hu-

man acquisitiveness and antagonism lead to violence. Shortly after John's visit, the Great Ape Language Lab is bombed by what initially appears to be animal rights activists. Isabel is badly hurt and disfigured in the blast; the bonobos escape, are recaptured, and then are sold by the University of Kansas to an unknown buyer, on the grounds that a continuation of the experiments would constitute a hazard to the university's employees. It turns out that the attack was orchestrated on behalf of the porn tycoon Ken Faulks, aided and abetted by Isabel's fiancé, the scientist Peter Benton, a careerist and "ape torturer." Peter is paid by Faulks to help set up the Ape House, a building equipped with cameras that broadcast the bonobos' interactions, especially their sexual activities, to a prurient TV audience. While this venture initially pays off—twenty-five million viewers subscribe to the show (150)—after some time, the bonobos' performance becomes boring despite the variability and frequency of their sexual engagements, and ratings drop. Apparently, violence is more attractive on television than sex is, but the innately peaceful bonobos resist all attempts to stir up conflict among them. The sagging interest peaks again when the young bonobo Makena gives birth in front of the camera, stirring in viewers, such as John, "something . . . primal" (255)—a climax that eventually results in John's acceptance of procreation: "Suddenly it all made perfect sense. To be able to create life with the woman he loved was a miracle of nature, perhaps the deepest need he'd ever felt" (277). Through his empathy with the simian mother, John is able to connect his own individual relationship with the "miracle" of creating life. The family, the site of reproduction, is thus sanctified (and the father becomes a bit like God).

While the bonobos' sexual versatility is presented in the narrative as positive—it contributes hugely to the peaceful cohabitation of the group—human sexual activity appears as strictly heterosexual and geared to reproduction. The emphasis on procreation explains the overall omission of homosexuality from the novel. The stance on sexuality that *Ape House* adopts is demonstrative tolerance. Within heterosexual parameters, variation and experimentation are endorsed, inside and outside of marriage, even including venal sex: a group of strippers is portrayed with sympathy. The novel also takes care to distance itself from the homophobia that is perceptible in the audience's reactions to some of the bonobos' practices. The target audience for the broadcasts—"working-class heterosexual adult human males" (177)—cheer female homosexual activities but feel intensely uncomfortable with male-to-male intimacy. This attitude is not shared by any of the novel's sympathetic figures, who consider all of the bonobos' activities as natural. Human homosexuality, however, simply does not occur. In contrast, Lydia in *Bruno Littlemore* has a lesbian relationship before she becomes Bruno's lover. In *Ape House*, almost all the human protagonists, including minor characters, either find happiness in a heterosexual relationship and/or get pregnant, as do both John's wife, Amanda, and the stripper Jovanka (who steals Ken Faulks's semen and thereby metes out

a dose of poetic justice to the unscrupulous mastermind behind the bonobos' exploitation). Counting Makena's delivery, the novel ends with three pregnancies.

The bonobos' versatile sexuality serves as a foil for the heteronormative narratives involving the human characters. Just as human homosexuality is tacitly passed over, so another, more fundamental boundary transgression goes unmentioned: sexuality between species. While there is physical contact between Isabel and her charges—playful "roughhousing" (11)—there is never any suggestion of an erotic undercurrent. The bonobos' "humanity" is repeatedly marveled at, but in effect the species boundary remains carefully intact. This is emphasized in the novel's conclusion. Due to Isabel and John's joint endeavors, the bonobos are rescued and given a new home, a habitat designed by Isabel's new boyfriend, Gary Hanson, and "protected by a double fence" (295). The fence restores the privacy of which the bonobos had been deprived by Faulks; it also demarcates the division between human and ape territory. The apes will live happily ever after in what amounts to a gated community protecting them from unwarranted human intrusion. But the fence also closes them in.

The happy ending is achieved after the human protagonists John and Isabel have learned the lesson of love taught by the bonobos. Their multiple quests—for the bonobos spirited away by Ken Faulks, for a mate and true love, and, perhaps most important, for a sense of self-worth—are finally successful. The overall harmony is sealed by a final kiss between man and ape, John and the bonobo matriarch Bonzi, sanitarily divided by a glass partition: "BONZI LOVE VISITOR. BUILD VISITOR NEST. KISS KISS. She stood on the rim and pressed her lips against the glass. . . . John lined himself up with Bonzi's lips and planted a big kiss on them" (300). *Ape love human*. All is well if humans develop the capacity to return this love, but without crossing the material and metaphorical line that divides the species. John will never share the nest built by Bonzi. Despite the novel's insistence that bonobos and humans belong to a biological as well as mental community of equals, the interspecies romance is safely contained not only by the glass partition, but by the heteronormativity and species normativity governing the rules of erotic engagement. The Darwinian narrative of the dissolution of species boundaries is thus tacitly overturned, even while the closeness between apes and humans is celebrated.

GAINING AND LOSING LANGUAGE IN *THE EVOLUTION OF BRUNO LITTLEMORE*

The quest structure connects *Ape House* to the romance, a popular and variable genre loosely defined, according to medievalist Helen Cooper, by a cluster of shared features. In addition to the quest, these include a concern with the hero's inward thoughts, feelings, and aspirations; a concern with ideals, especially those

of chivalry; a belief in human perfectibility in a social context; and a happy ending.[41] While not all of the generic features are realized, *Ape House* shares several aspects with the romance beyond the heterosexual love plot with which contemporary forms of the genre are frequently associated. Most important are the faith in human perfectibility—which both Isabel and John achieve—and the realization of unworldly ideals in a mundane environment. What the ideals of chivalry were for the medieval romance are the values surrounding interspecies relations in *Ape House*, for instance mutual respect, the recognition of the other's personhood and rights, and codes of behavior such as vegetarianism. *The Evolution of Bruno Littlemore* is much more skeptical about the viability of such ideals. Hale's novel does take up several romance features but only to subvert them; it can more properly be called an anti-romance (just as it is, in various ways, an anti-bildungsroman). The love plot ends tragically; and mutual respect across species boundaries yields to rejection, revilement, and finally murder. Bruno, similarly to Gruen's bonobos, ends up in a secure ape research facility, but whereas the bonobos' new home is denoted as a paradisiacal, self-governed space—"the most ape-friendly habitat I've ever seen outside of a jungle," as Isabel observes (295)—the Zastrow National Primate Research Center where Bruno is finally confined resembles both a prison and a madhouse.

The important theme of ape language formation is handled in a strikingly different way in the two novels. In *Bruno Littlemore*, language is not represented as a property that one simply "has" and can use unproblematically for the purposes of communication. Bruno's progressive acquisition of language is punctuated by various linguistic crises, culminating in Lydia's loss of language due to a brain tumor and his own final perception of language as a metaphorical prison, encoding humans' alienation from life and the knowledge of death rather than the message of love and nest building expressed by Bonzi at the end of *Ape House*.

The bonobos' mastery of ASL is an essentially plausible extension of the known language projects with great apes. In contrast, *Bruno Littlemore* is not content with offering a probabilistic thought experiment based on existing scientific practices; rather, Hale's story of the speaking chimp, while taking cognitive-psychological research with apes as its point of departure, pushes beyond the limits of realistic representation into the fantastic and the grotesque. The novel's frame of reference is not only the everyday world but a long literary tradition of imagining the Other. This is emphasized by a web of intertextual references, most important to Laurence Sterne's *Tristram Shandy*, Franz Kafka's "A Report to an Academy," Georg Büchner's *Woyzeck*, and William Shakespeare's *The Tempest*, as well as to Charles Darwin's writings. This marked investment in the novel's own literariness results in a different conceptualization of language than the one in *Ape House*, where constative and imperative uses of language prevail (for example, Bonzi uses a computer to order food for the Ape House). In *Bruno Littlemore* language is

not exclusively functional, directed at communication with others, but contains a strong self-referential and even solipsistic dimension. It is poetical in the sense of Roman Jakobson, that is, not concerned with content but with the message itself, or, in Bruno's own term, it is musical—pure noise. Accordingly, Bruno's linguistic ability is not the result of systematic teaching, but of chance, imitation, play, and love. He learns to speak from and has his "first completely reciprocal conversation"[42] with Haywood Finch, the mentally retarded night watchman of the University of Chicago's Erman Biology Center, where the young chimp is a subject in a series of cognitive experiments. Initially treated more like a thing than a sentient being, Bruno is left behind at night in a state of "panic, terror, abandonment" (57). From his speechless but not voiceless nocturnal rages—"I wept and screamed. I screamed and wept" (ibid.)—Bruno is rescued by Haywood. Perhaps precisely because of his mental handicap, Haywood is able to perceive what the highly trained scientists, seeing only the object of their research, have overlooked: the fellow creature. Their conversation consists of the mutual imitation of nonsensical sounds: "From a raw clay of nonsense we were every moment molding signifiers that had no signifieds, empty signs, decorative and happily meaningless words. Did we communicate anything? No. But language for the sake of communication follows language that is noise for the sake of fun—that is, *music*—and—this I truly believe—all truly beautiful language is for the sake of both: communication and music" (63).

Bruno's entry into culture—his first word, his first signifier that refers to a signified—happens outside institutionalized ape language studies: at night, unobserved, in a closed and deserted lab. The momentous scene of the ape's first meaningful utterance goes unrecorded by science, or rather, the awe and intellectual upheaval connected to the transgression of the linguistic species boundary is registered not, as in *Ape House*, by the human interlocutor but by the speaking ape himself. At one of their secret nightly sessions, Haywood Finch "asks" Bruno's name by pointing at him:

> I pointed at myself and made my first attempt at conscious spoken language:
> "Ooh, no."
> I almost slapped my hands over my mouth—maybe I even *did* slap my hands over my mouth in astonishment at the dangerous magical noise that had just come out of it! It was a *word!* It was—it was *my own name!* (72)

Haywood shares Bruno's glee at the "noise," but it falls to Bruno to articulate the intellectual shock experienced when the demarcation line between apish mimicry and human poiesis is crossed. As Judith Butler has argued with reference to Louis Althusser, social existence is enabled when a being is called by a name or, in Althusser's term, "interpellated" by an authority.[43] Although Bruno is given his name by the scientists, he is not interpellated by them, not accorded the status

of a subject, because this would be unthinkable in relation to a mere animal. It is Haywood Finch, the most subaltern human being imaginable, who *asks* him his name and thereby allows Bruno to name himself. Haywood thus fulfills a decisive function in Bruno's transition into a social existence, however liminal it is destined to remain: "One comes to 'exist' by virtue of this fundamental dependency on the address of the Other. One 'exists' not only by virtue of being recognized, but, in a prior sense, by being *recognizable*" (*Excitable Speech*, 5). The situation is tautological: prior to his first speech act, Bruno is not "recognizable" to the scientific authorities as anything other than an animal; but without the recognition by an Other, he cannot speak. Haywood's intervention is therefore crucial, albeit in itself insufficient for Bruno's effective transformation into a subject.

As Haywood, due to his marginal social position, does not have the authority to affirm Bruno's speech act, the utterance of the name has to be repeated in the presence of somebody so authorized. However, this is not so easy. Bruno succeeds in making his newly acquired personhood known to Lydia, but when he is asked—finally, interpellated—to repeat his speech act in the presence of the other scientists, and into a recorder, he remains silent: "I opened my mouth. But my lungs had been robbed of their oxygen. I don't know what happened. I had just spoken—it was no accident, I knew that I had consciously and deliberately spoken my name to Lydia just a moment before. But I was speechless now. My diaphragm would not cooperate, it refused to provide the upward thrust of air in the throat necessary to bring a word into being. A demon of silence had entered me" (85). Bruno is betrayed by his creatureliness, by his body's failure to cooperate in his conscious bid for recognition by a human Other.

Eventually, Bruno's distinctiveness from other apes *is* perceived and he achieves what he wants: he is taken away from the lab to cohabit with Lydia. But henceforward, Bruno's linguistic and social status remains precarious, his aspiration to become human punctured by relapses into apish silence and rage. Like his literary predecessors, Shakespeare's Caliban and Kafka's Red Peter (Bruno's father, caught in the wild and brought to Chicago's Lincoln Zoo, is named after Kafka's speaking ape), Bruno is caught in a state of unhappy in-betweenness. And while he follows, like Tarzan, the stages of an ontogenetic recapitulation of phylogenetic evolution, this upward trajectory is repeatedly disrupted by external circumstances and his own apelike nature, until in the end a disillusioned Bruno repudiates human language and culture, only to realize that he "cannot unlearn my humanity" (575), that he is trapped in the prison house of language, a condition that mirrors his actual existence. Bruno is literally in a prison-like research institution while he is dictating his memoirs, shut away because he killed the scientist Dr. Norman Plumtree, Lydia's former boss, who performed artificial insemination—using his own semen—on a chimpanzee, Bruno's sister. Bruno's life is saved precisely by his in-between status: neither fully human—"I am not and have never been regarded

as a legal citizen of this or any nation" (570)—nor fully animal, his life is dedicated to science. After an only partly successful interpellation into a social existence, he returns to what he was in the beginning—an object of scientific inquiry: "They'll probably put my brain in a jar and test the thisness and thatness of it. And I am sure their scrutiny will reveal nothing" (ibid.).

One of the reasons for Bruno's disappointment with the human condition is Lydia's tragic fate. As Bruno grows up and simultaneously becomes more and more human—achieving language, bipedalism, and literacy; wearing clothes; and becoming an artist—their relationship changes, culminating in physical intimacy and, finally, in Lydia's pregnancy. But his ascent to humanity is chiastically accompanied by Lydia's descent. The attractive, healthy, young, promising scientist first loses her job at the University of Chicago—partly because "project Bruno" doesn't turn out as expected—and then more and more her control over her life, until her severe headaches are diagnosed as an untreatable tumor. The growth presses on the Broca's area in her brain, resulting in an increasingly debilitating aphasia:

> Lydia was out of commission. Even when she was awake, she just puttered around our apartment with the vacant eyes of a starving person, picking up things and putting them back down, often babbling incoherently, or else remaining disturbingly silent. If she wanted to salt her food at the table she would point at the saltshaker and say, "The . . . the . . . the . . . the . . . . . the . . . " Meaning, of course, "Please pass the salt." Lydia's silences grew longer, darker, more profound. Her words were leaving her. One by one the elements of her vocabulary were packing up their things and vacating their apartments in the condemned building of her mind. (347–48)

Lydia still has a hold on the signified but cannot produce the corresponding signifier. It is almost as if only a limited amount of language proficiency were available, and the better Bruno gets at expressing himself, the more Lydia goes into a decline. Sliding into poverty, dependence, and the loss of self-consciousness, she is brutally victimized by Christian fundamentalists incensed by her sexual relations with an ape and by the fact that she carries Bruno's baby: they assault her in her own flat while her housemates, Bruno and her friend and former lover Tal, are out for a walk, and rip the fetus from her belly. Lydia is only narrowly saved from bleeding to death, but never fully recovers. After a long period of hospitalization, she succumbs to her tumor.

However, Lydia's descent into an ultimate "vegetable" state, while inversely symmetrical to Bruno's evolutionary rise, is not explicable in terms of a harsh poetic balance. While her case of language loss is the most extreme, the novel abounds with figures, both human and simian, who are "pitifully imprisoned behind an opaque wall of incommunicability" (264). Even while displaying his linguistic virtuosity as the author of his memoirs, Bruno repudiates the bliss he experienced

during his language lessons with Haywood Finch, and denounces language, the sign of human dignity, as either an inadequate tool or the instrument of suffering. Like Caliban, Bruno's profit on learning language is that now he knows how to curse his mentor, humankind—and how to write novels. The celebration and the critique of language, as humankind's greatest achievement and bane, hover in unresolved contradiction.

THE PRIMATOLOGIST'S BODY: REPRODUCTION AND VIOLENCE

Primatology is not only the study of apes. Apes are construed as the human Other that serves to delimit what we think of the human self, a self that is always gendered. Not least for this reason it is significant that the human heroines in *Ape House* and *The Evolution of Bruno Littlemore* are trained primatologists. Their primary meeting ground with the apes is their workplace, the lab (importantly, not a habitat in the wild or a zoo). The lab is a heavily regulated and depersonalized part of a research institution. Nevertheless, the women primatologists soon cross the border between the institutional and the private; they become emotionally involved with their objects of research. Concomitantly, these women's gendered, biological bodies soon become a main focus of attention. It is not only women's reproductive capacity that is negotiated here in relation to the Darwinian narrative, but also the creatureliness of their bodies, their conspicuous vulnerability, which links them to mortal animals and hence disturbs the religious notion of humans as, sole among all creatures, immortal. In this respect the novels can be linked, albeit tenuously, to the agenda of posthumanism, in particular its insistence—in Cary Wolfe's formulation, which in turn draws on Jacques Derrida's work on animals—on human embodiment in a material world. As mentioned above, however, the fact that it is specifically the female body that is connected with injury, illness, and death as well as procreation limits the posthumanist impact of both narratives, since in Western dualistic thinking woman has always been aligned with nature, the body, and animality against the male-coded categories of culture, the mind, and rationality.[44]

Language is also traditionally positioned on the male side of the dichotomy. Lydia's aphasia can be seen as the epitome of woman's exclusion from the symbolic order and, hence, language. However, the situation in her case is more complex than that. As a primatologist, she is also connected to rationality and science. As Bruno's surrogate mother, she is responsible for teaching Bruno to speak following his initiation into language by Haywood Finch, and she functions as a mediator, a spokesperson, between their private world and the external world of science and society. For a long time, she is actively in control of her speech acts and her actions in a way Bruno is not. Her agency is undermined only by initially invisible and

ultimately uncontrollable physiological processes inside her body, the growth of a tumor in her brain and the growth of a baby in her womb.

As Donna Haraway has remarked, "Primatology is western discourse, and it is sexualized discourse."[45] Despite its entanglement in colonial history and a framework of heroic exploration, primatology has achieved an exceptional status regarding its disciplinary gender politics. Since the Second World War, women field researchers have achieved great success, often helped in their careers by the powerful "father figure" of Louis Leakey. In her seminal study *Primate Visions*, Haraway has analyzed the interaction of gender, race, and popular media within field studies on apes.[46] Embodied by the prominent figures of Jane Goodall, Dian Fossey, and Biruté Galdikas in the pages of *National Geographic*, in documentaries, and in feature films such as the Fossey biopic *Gorillas in the Mist* (1988), primatology has come to be perceived as a "women's science" which, as Haraway points out, does not necessarily mean feminist science.[47] In particular, Haraway critically analyzes the positioning of women primatologists as go-betweens on the border between nature and culture. The women form special bonds with apes in contrast to their male colleagues' greater detachment: "apes and white people, especially women represented as surrogate mothers and scientists, were placed together *simultaneously* in the 'natural' world of the forest, sharing adolescence and child-rearing practices, and in the 'social' world of language studies, sharing a love for cuddly pets."[48] The gendered division of labor in ape studies still places man outside nature, whereas women primatologists, in their double role as scientists and surrogate mothers, serve as conduits, as "highly replayed mediators at the modern boundary between culture and nature."[49] The strange duality of the woman primatologist's position has been expressed by Francine Patterson, a developmental psychologist who taught ASL to the gorilla Koko, whom she also raised from infancy: "From the beginning of Project Koko I had a dual role: I was a scientist attempting to teach a gorilla a human sign language, but I was also a mother to a one-year old infant with all an infant's needs and fears."[50]

In Sara Gruen's and Benjamin Hale's novels, the narrative of the woman primatologist's closeness to (simian) nature intersects with the genre of the human-simian family romance. The primatologist needs to find her place as both a daughter and a mother; this task is successful in *Ape House* but ultimately fails in *Bruno Littlemore*. Additionally, the primatologist's gendered body becomes a site of violent incursions. In Lydia's case especially, her womb is the site of struggle between her transgressive sexuality and the Christian fundamentalists' desire to maintain the purity of humankind by violently "cleansing" the polluted female body. As I discuss below, this is also a struggle about words, meaning, and reading, about the relation between the body and language in which the female body becomes the medium of male inscription.

The female protagonists in both novels come from dysfunctional families and

find in their affiliation with apes a *better* surrogate family, thus enacting precisely the pattern of Freud's family romance. While Isabel and Lydia function as mothers who educate and protect the apes, they are in turn "adopted" by them and find in the mixed human-simian family the emotional warmth they lack elsewhere. In particular Isabel, whose mother was an alcoholic and a part-time prostitute, repeatedly calls the bonobos "her family" (10, 11, 90) and finally succeeds in creating a home for the apes and herself: "We'll go home soon, Bonzi. It will be a different home, but it will be a good home, and I'm going to be there. I'm never leaving you again" (286). Isabel's homemaking on behalf of the bonobos—building a new, better Ape House with the assistance of her new lover—can be regarded as a surrogate for, and perhaps a prelude to, the founding of her own reproductive family.

Isabel's quest for a (human and simian) family of her own is interlaced with a parallel trajectory, which could be called the achievement of agency and comfort within her own body. Due to her unhappy family background, she seems insufficiently anchored in her body and, consequently, distanced and insecure. Her problematic relation to her body is aggravated by the injuries she sustains in the bombing of the Great Ape Language Lab. Although Isabel is, in contrast to Lydia, only a random victim of attack, the resulting disfigurement is traumatic: "Isabel found herself looking at a complete stranger. The scalp and checks were swathed in gauze. The nose was broad and smashed, with an absurd nose diaper taped loosely beneath the oxygen piping to catch the bloody runoff. Its flesh was swollen and blue, with specks of reddish purple. The eyes were slits between swollen pads of flesh and the white of one was scarlet. Trembling fingers appeared beside her face, and these were indisputably hers" (44). This confrontation with her disfigured mirror image marks the nadir of her alienation from her own body. Her visible impairment is compounded by the curtailing of her communicative capacity; because her jaw is wired, she cannot speak and is forced to use ASL, which in turn results in the police treating her as physically and mentally disabled: the detective "practically shouted, leaving a space between words and phrases" (45). As a witness, she is almost on a par with the bonobos, who are not questioned at all. Isabel's loss of agency and personal rights reaches the lowest point when her picture is taken and published without her permission. Like the apes on reality TV, she has no privacy and no control over the circulation of her image. At this stage, Isabel, speechless and immobilized, is reduced to a passive object, almost like an animal.

However, the crisis marks a turning point in her life. Isabel progressively reclaims her lost agency. The battle on behalf of her "family," the endangered bonobos, results in her psychological recuperation alongside her physical recovery. John observes the difference: "She seemed so happy and relaxed. Even on the day they'd met, before the bombing, there had been something reserved and anxious about her. There was no sign of that now. The very way she moved her body was different. The old Isabel would never have taken his arm" (297). Body and soul are

healed; the rift between them has closed. The successful emancipatory tale finally joins the family romance; the new ape habitat symbolizes both Isabel's professional success and her newfound private happiness.

In *The Evolution of Bruno Littlemore*, the opposite movement occurs: the family romance is replaced by the erotic romance, which in turn leads to tragedy. From being Lydia's adopted "baby" (28), Bruno graduates to become her lover, and finally makes her pregnant. This interspecies transgression is conceptualized in Bruno's retrospective commentary as both deviance and perversion (42) *and* as emotional healing—for Lydia, who lost her husband and unborn child, and for himself, who was separated from his family of origin: "In a past life, Lydia had been robbed of a son and a lover. And I, Bruno, eventually gave her back both. So yes, obviously there was a sense of some deep-seated and dangerous taboo that our relationship violated. But this taboo was not bestiality—it was incest" (193). Bruno presents us with a Darwinian narrative of kinship and evolution that unfolds through his becoming human, and with a Freudian, oedipal narrative of boundary transgression within the family. Positioned between excessive exogamy and incest, there is no social place for Bruno and Lydia's love. However, the relationship is flawed in another respect as well. The first time Bruno penetrates Lydia she is unconscious, knocked out by the strong sleeping pills she uses during her migraines. Bruno's trespass constitutes what Lydia herself will later call rape, although she comes to accept the situation and, according to Bruno, soon returns his passion. However, we never gain insight into her view of things apart from the dialogue reported verbatim, to which her contributions become less and less frequent. In contrast to Isabel, Lydia is successively deprived of her agency by her illness and dependency on heavy medication, by Bruno's ruthless and immature pursuit of his gratification, by his narrative that ultimately frames her as a silenced object, and finally, by the violence done to her.

Lydia's pregnancy is discovered when she is hospitalized on account of her brain tumor. The concomitant exposure of Bruno's paternity is instantly passed to the media, with the result that religious protesters gather in front of Lydia and Bruno's apartment house, "chanting their idiocies outside of our apartment all day and night" (332). Despite Lydia's debilitated state after her brain surgery, the Christian fundamentalists show no mercy. Shouting incessantly through a megaphone, the protesters call Lydia "the whore of Babylon, calling [Bruno] an abomination before God and man, asserting that there lived in her belly the child of Satan" (335). While Bruno invokes the narrative of genetic closeness—"Humans and chimps have more chromosomes in common than a donkey and a horse" (330–31)—to justify the relationship as "only natural" (331), the protesters see it as a desecration of the divine will to keep the species separate. The conflict thus starts as a war of words in which the protesters set up Lydia, Bruno, and their unborn child as creatures outside the pale of humanity, and therefore killable. The Old Testament

furnishes the protesters with the powerful vocabulary that cancels out the interspecies lovers' social existence, and thus their right to be protected from harm. The counternarrative that science could provide, precisely the Darwinian narrative of the human-simian relationship, cannot at this stage be uttered, because the representative of science, the primatologist Lydia, cannot speak, and Bruno, a juvenile animal and noncitizen, cannot make himself heard. Bruno's apology for their love can be uttered only in retrospect, through the dictation of his autobiography.

As Kevin W. Saunders has argued, hate speech is closely connected to a conceptualization of sexual acts as obscene; obscenity in turn is deeply rooted in monotheism: "Once God becomes a singular, nonsexual being, showing humans in sexual acts is depicting humans as on the animal side of a divine/animal divide."[51] In Western monotheistic culture, sex defines the chasm between the divine and the animal; therefore, "obscenity is not really about sex" but "about the placement of humankind in the hierarchy of the animal."[52] Unsurprisingly, Darwin's negation of a clear separation between the different species and the concomitant repositioning of humankind, from the divine to the animal side of the divide, only served to heighten prevalent anxieties about human sexuality. According to Saunders, the increase in obscenity prosecutions from the late nineteenth century through the first half of the twentieth in the United States was directly related to the growing public awareness of, and resistance to, Darwinism: "It is as though society expressed itself in denial of Darwin's claims by proscribing the depiction of humans engaged in animal or such nondivine activities."[53] The fact that Lydia and Bruno not only had sex but actually succeeded in merging their gametes thus confirms the Christian fundamentalists' worst fears: humans are animals. The Judeo-Christian promise of dominion over nature is negated by Darwin's assertion that man is part of nature. This is Bruno's conclusion too: "And they hated us because of this: because here, swimming in a pouch of fluid in Lydia's lower abdomen, was living, unassailable proof of human evolution" (336). The Darwinian narrative literally comes true in this union. The protesters' nonverbal act that follows upon their hate-filled speech acts is designated to undo this "becoming flesh" of Darwin's word, by in turn literalizing their reading of the Bible. The injunction taken from Leviticus 20:16—"And if a woman lies with any animal, you shall kill both the woman and the animal. They must be put to death. Their blood shall be upon them"—which Bruno finds smeared on the wall of Lydia's bedroom (366), has been acted out, at least in its first part, on Lydia's body.

In *Excitable Speech*, Judith Butler, following J. L. Austin, distinguishes between hate speech as an illocutionary speech act that performs the injury done to the addressee at the very moment of utterance, and hate speech as a perlocutionary speech act that describes an injury or produces one as a consequence (18). In the second model, which Butler advocates, there is a time lag between the utterance and its effect; this allows the addressee to rearticulate the original utterance and

thereby to deflect its injurious effect. Bruno's entire autobiography can be regarded as such an attempt at rearticulating the fundamentalists' hate speech and, more broadly, the anthropocentric narrative that denies him recognition as a being of equal value. However, in Lydia's case, hate speech is swiftly followed by an act of hatred, and the injury she sustains cannot be rewritten and undone, partly because she was deprived of speech and thus of agency even before this deed. Her body is reduced to a mere site of struggle, ravaged by the conflict between the biblical and the evolutionary narratives about men and apes. While the two speech acts, the fundamentalists' "reiteration" of Leviticus and Bruno's autobiographical assertion of his equivalence with humans, are certainly not homologous, they have one aspect in common: Lydia has no active share in the construction of either narrative.

Darwin is still very present on the American scene. The conflict epitomized by the Scopes trial—evolution versus Genesis—continues to influence public debates and political activism, much more so in the United States than in the public sphere of most European countries. However, negotiations of the Darwinian narrative have become vastly more complex since the days of Bryan's and Darrow's heated exchanges at Dayton. Research in genetics, primatology, and evolutionary psychology has provided ample evidence for the close kinship between human and nonhuman primates, and all animals. The ecological movement similarly emphasizes the interconnectedness of all living beings, and the devastating impact the wrong choices of the dominant species may have on all the others—a theme taken up in several contemporary novels, including Jonathan Franzen's *Freedom* (2010) and T. C. Boyle's *When the Killing's Done* (2011). But advances in our knowledge of nature do not signify closure; on the contrary, the current proliferation of fiction on animals, nature, and science suggests that this nexus provides us more than ever with food for imaginative thought experiments.

The two novels discussed here are further examples of the topicality of many questions raised by Darwin and those working in his tradition. *Ape House* and *The Evolution of Bruno Littlemore* address in particular the issue of ape language acquisition and the resultant question: What would happen if experiments really produced apes who are linguistically humans' equals? If one takes a closer look, the answer is rather unsettling. Even in Gruen's determinedly cheerful novel, the bonobos end up in confinement; Hale's speaking chimp, Bruno, fares even worse. Since apes have traditionally served as figures of reflection on the human condition, their denial of freedom in both novels suggests that language is not a boon elevating the human species above nature, but rather a manacle that keeps humans locked in a prison of their own making. This pessimistic view is largely obliterated in *Ape House*, but Hale's darker tale joins the literary tradition, from Shakespeare to Kafka, that skeptically challenges the belief in the transparency of language as well as the narrative of human ascent.

The speaking ape is not the only figure through which the vulnerability and precariousness of the human status is explored in the novels. It is significant that in both cases, the ape's counterpart is a woman primatologist. Drawing on the complex positioning of women as mediators between nature and culture in real-life primatology, which has been analyzed by Donna Haraway, both novels depict their female protagonists as go-betweens with a special emotional and physical connection to apes. In consequence, these women's hold on a socially secured subject status is shown to be much more tenuous, much more vulnerable than that of the various powerful male figures in the novels. This precarious status makes the women's position converge with that of the animals, to the point of experiencing a similar helplessness and subjection at the hands of scientific, medical, and penal institutions.

The fantasy of the interspecies romance is played out in these women-ape relationships, but while its transgressive potential is rendered innocuous through a carefully constructed heteronormative framework in *Ape House*, the cross-species transgression is flaunted in *The Evolution of Bruno Littlemore*. Does this mean that Hale's novel, with its formal affinity with postmodernism, comes closer to fulfilling the mandate of posthumanism, namely to disrupt the logic of the traditional narratives of anthropocentrism and speciesism? I would argue that it falls short of this—possibly unattainable—goal. Despite its explicit alignment with the Darwinian narrative, and despite its rhetorical fireworks that paradoxically support a notion of language as a deficient prosthesis of the human animal, *Bruno Littlemore* remains committed to a fundamentally anthropocentric and androcentric narrative. The true Other we encounter in this novel is not the almost-human ape, but the dying Lydia. But the novel ultimately shies away from imagining her naked life, divested of consciousness and dignity. Instead, we get Bruno's self-involved memoir, which consistently presents Lydia as an object, first of desire, then of pity. To look at a suffering, silenced woman from a male vantage point does not exactly constitute a break with traditional gender patterns. Despite its formal sophistication, Hale's novel misses the chance to explore Otherness at the interstices between the human and the animal, between social existence constituted by language and the mortal body beyond language.

NOTES

1. Peter J. Bowler, *Monkey Trials and Gorilla Sermons: Evolution and Christianity from Darwin to Intelligent Design* (Cambridge, Mass.: Harvard University Press, 2007), 3.

2. On the Scopes trial in the wider context of evolutionism and fundamentalism, see in particular the studies by Adam Laats, *Fundamentalism and Education in the Scopes Era: God, Darwin, and the Roots of America's Culture Wars* (Basingstoke, England: Palgrave Macmillan, 2010); and Jeffrey P. Moran, *American Genesis: The Antievolution Controversies from*

Scopes to Creation Science (Oxford: Oxford University Press, 2012). See also Paul K. Conkin, *When All the Gods Trembled: Darwinism, Scopes, and American Intellectuals* (Lanham, Md.: Rowman and Littlefield, 1998). On the reception of Darwinism before 1900, particularly by American theologians, see Jon H. Roberts, *Darwinism and the Divine in America: Protestant Intellectuals and Organic Evolution, 1859–1900* (Madison: University of Wisconsin Press, 1988).

3. See Virginia Richter, *Literature after Darwin: Human Beasts in Western Fiction, 1859–1939* (Basingstoke, England: Palgrave Macmillan, 2011), 62–118, for the fear of and fascination with apes in fiction from 1859 to the 1930s.

4. Bowler, *Monkey Trials and Gorilla Sermons*, 28f.

5. Moran, *American Genesis*, 15–17.

6. William Jennings Bryan, "Summation for the State from the Scopes Trial," in *Adam or Ape: A Sourcebook of Discoveries about Early Man*, 2nd ed., ed. L. S. B. Leakey, Jack Prost, and Stephanie Prost (Cambridge, Mass.: Schenkman, 1982), 43. Hereafter cited in the text as "Summation."

7. Moran, *American Genesis*, 99–100.

8. On degeneration, see William Greenslade, *Degeneration, Culture, and the Novel, 1880–1940* (Cambridge: Cambridge University Press, 1994); and Daniel Pick, *Faces of Degeneration: A European Disorder, c. 1848–c. 1918* (Cambridge: Cambridge University Press, 1989).

9. See Roger Lewin, *Bones of Contention: Controversies in the Search for Human Origins*, 2nd ed. (Chicago: University of Chicago Press, 1997); for a summary, see esp. 301–19.

10. See Ernst Mayr, "Prologue: Some Thoughts on the History of the Evolutionary Synthesis," in *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, 4th ed., ed. Ernst Mayr and William B. Provine (Cambridge, Mass.: Harvard University Press, 1998), esp. 3–39 on the status of the Darwinian theory and competing approaches to evolution in the 1920s and 1930s.

11. Charles Darwin, *The Origin of Species*, ed. Gillian Beer (Oxford: Oxford University Press, 1996).

12. See Peter J. Bowler, *The Non-Darwinian Revolution: Reinterpreting a Historical Myth* (Baltimore, Md.: Johns Hopkins University Press, 1992).

13. David Amigoni, "Evolution," in *The Routledge Companion to Literature and Science*, ed. Bruce Clarke and Manuela Rossini (London: Routledge, 2011), 118.

14. See Charles Lyell, *Principles of Geology: An Attempt to Explain the Former Changes of the Earth's Surface, by Reference to Causes Now in Operation* (Cambridge: Cambridge University Press, 2009), 1:1–3.

15. Amigoni, "Evolution," 118.

16. George Levine, *Darwin the Writer* (Oxford : Oxford University Press, 2011), 75.

17. Robert N. Proctor and Londa Schiebinger, preface to *Agnotology: The Making and Unmaking of Ignorance*, ed. Robert N. Proctor and Londa Schiebinger (Stanford, Calif.: Stanford University Press, 2008), vii.

18. For example, the ETH Zurich and the Max Planck Institute for the History of Science, Berlin.

19. Michael Gamper, "Experimentelles Nicht-Wissen: Zur poetologischen und epistemologischen Produktivität unsicherer Erkenntnis," in *Experiment und Literatur: The-*

men, Methoden, Theorien, ed. Michael Gamper (Göttingen: Wallstein, 2010), 539–40, my translation.

20. Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth-Century Fiction*, 3rd ed. (Cambridge: Cambridge University Press, 2009).

21. Thomas Henry Huxley, *Evidence as to Man's Place in Nature* (Cambridge: Cambridge University Press, 2009), 57.

22. Naturally, the ape theme is not confined to American fiction. Perhaps the internationally best-known novel of the kind is Peter Høeg's *The Woman and the Ape* (1996), which combines the motif of the wise ape with that of the interspecies romance.

23. The literature on ape communication is too extensive to be surveyed here. A theory I find particularly convincing is Michael Tomasello, *Origins of Human Communication* (Cambridge, Mass.: MIT Press, 2008). For a different position, see the contributions by Roger S. Fouts and Deborah H. Fouts, H. Lyn White Miles, and Francine Patterson and Wendy Gordon, all in *The Great Ape Project: Equality beyond Humanity*, ed. Paola Cavalieri and Peter Singer (New York: St. Martin's Griffin, 1993).

24. Cary Wolfe, *Animal Rites: American Culture, the Discourse of Species, and Posthumanist Theory* (Chicago: University of Chicago Press, 2003), 3. Hereafter cited in the text as *Rites*.

25. Cary Wolfe, *What Is Posthumanism?* (Minneapolis: University of Minnesota Press, 2010), 80.

26. One notable exception is *Great Apes* (1997) by the British novelist Will Self, a thought experiment in which apes are the leading species and humans are kept in zoos. Self details, for example, their differences in spatial perception and body movement.

27. According to Freud, in the family romance (*Familienroman*) the child fantasizes that he or she has been adopted, and that the lost biological parents are more perfect, loving, and socially superior than the actual parents. Sigmund Freud, "Family Romances," in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, trans. and ed. James Strachey (London: Vintage, 2001), 9:235–42.

28. Charles Darwin, *The Descent of Man* (New York: Prometheus, 1998), 151.

29. Huxley, *Evidence*, 110.

30. Ibid., 112.

31. Such "stone age stories" include "The Grisly Folk" (1921) and "A Story of the Stone Age" (1899) by H. G. Wells, and *The Story of Ab* (1903) by Stanley Waterloo.

32. See, for example, Francine Patterson and Eugene Linden, *The Education of Koko* (New York: Holt, Rinehart, and Winston, 1981).

33. Tomasello, *Origins of Human Communication*, 8–10.

34. Ibid., 93–94, 98.

35. Kevin N. Laland and Bennett G. Galef, introduction to *The Question of Animal Culture*, ed. Kevin N. Laland and Bennett G. Galef (Cambridge, Mass.: Harvard University Press, 2009), 9–10. For an extensive argument in favor of ape culture, see Frans de Waal, *The Ape and the Sushi Master: Cultural Reflections by a Primatologist* (London: Allen Lane, 2001).

36. Sara Gruen, *Ape House* (2010; rpt., New York: Spiegel and Grau, 2011), 4–5. Page references are hereafter cited in the text.

37. Christophe Boesch, "Behavioural Diversity in *Pan*," in *Behavioural Diversity in Chim-*

panzees and Bonobos, ed. Christophe Boesch, Gottfried Hohmann, and Linda F. Marchant (Cambridge: Cambridge University Press, 2002), 4.

38. See, for example, an article by Michael Ghiglieri on Goodall's research, "War among the Chimps," *Discover* (Nov. 1987): 67–76. The "chimp wars" described by Goodall also form the subject matter of William Boyd's novel *Brazzaville Beach* (1990).

39. Boesch, "Behavioural Diversity in *Pan*," 4–5.

40. Alla Katsnelson, "Frogs and Humans Are Kissing Cousins," *Nature* (2010), http://www.nature.com/news/2010/100429/full/news.2010.211.html (accessed July 2, 2012).

41. Helen Cooper, *The English Romance in Time: Transforming Motifs from Geoffrey of Monmouth to the Death of Shakespeare* (Oxford: Oxford University Press, 2004), 9–10.

42. Benjamin Hale, *The Evolution of Bruno Littlemore* (New York: Twelve, 2011), 62. Page references are hereafter cited in the text.

43. Judith Butler, *Excitable Speech: A Politics of the Performative* (London: Routledge, 1997), 2. Hereafter cited in the text as *Excitable Speech*.

44. See Susan J. Hekman, *Gender and Knowledge: Elements of a Postmodern Feminism* (Boston: Northeastern University Press, 1990), esp. 30–39.

45. Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (London: Routledge, 1989), 11.

46. In addition to Haraway, see Marianne Sommer, *Foremost in Creation: Anthropomorphism and Anthropocentrism in National Geographic Articles on Non-Human Primates* (Bern: Peter Lang, 2000).

47. Haraway, *Primate Visions*, 151.

48. Ibid., 145.

49. Brian E. Noble, "Politics, Gender, and Worldly Primatology: The Goodall-Fossey Nexus," in *Primate Encounters: Models of Science, Gender, and Society*, ed. Shirley C. Strum and Marie Fedigan (Chicago: University of Chicago Press, 2000), 457.

50. Patterson and Linden, *Education of Koko*, 13.

51. Kevin W. Saunders, *Degradation: What the History of Obscenity Tells Us about Hate Speech* (New York: New York University Press, 2011), 5.

52. Ibid.

53. Ibid.

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